Assessing Environmental Awareness of Learners Near Dumpsite Area: Foundations for Dewey-inspired Instructional Toolkit

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Environmental Education is not new to the Philippine educational system, however, environmental education has many problems such as, no stand alone subject, teacher lack of training, and most especially the gap between awareness and practice. Studies have shown that environmental education in the Philippines produces learners that are environmentally aware but lack environmental practice. Thus, this study assesses the current environmental awareness of learners in Sultan Mamarinta Panandigan Integrated School and Cabili village Elementary School which serves as the basis of developing an instructional toolkit. Guided by John Dewey's philosophy of experiential learning and Arne Naess's deep ecology, the study uses participatory activities like picture base survey and interview, storytelling, drawing, and nature walks and observation. These approaches allow children to express their ideas and feelings about nature in ways that are engaging. The findings showed that the current environmental awareness of learners from Sultan Mamarinta Panandigan Integrated School and Cabili village Elementary School are at the surface-level; they can identify basic environmental concepts but cannot articulate a deeper understanding on the environment's concept, relationship, problems and action. Thus, the instructional toolkit is designed to address this gap. The toolkit encourages learners to learn through experience and inquiry. The instructional toolkit is equipped with activities that are not just engaging but has guided reflection intended to cultivate critical thinking and encourage learners to act based on their knowledge. Furthermore, the study with the help of the Dewey-inspired instructional toolkit seeks to support teachers, parents, school and community in raising a generation of environmentally aware young people, whose awareness is far beyond surface level and is empowered to make a difference by taking action.

Keywords: *Environmental Education, Experiential Learning, Inquiry-based Learning, Environmental Awareness, Instructional Tool.*

Introduction

Background of the Study

The distraction of the natural environment, given that it is the source of life for all living species on the planet, can cause human inhalation. Environmental concerns were already evident in today's society; people experienced natural occurrences as a result of these difficulties, which have caused not just humanity to suffer but also all the living beings as well. This environmental issue impacted not only people's physical health, but also their economic and political well-being. And as a result, mankind has begun to campaign for environmental preservation; yet, many of people did not comprehend the significance of correct environmental practice; people tend to recognize that environmental preservation is vital but do not practice environmental preservation.

Even with this Global effort, like the 17 Sustainable Development Goals of United nation and the National initiatives like National Greening Program (NGP), Urban Greening Initiatives, Water Management and Protection, Renewable Energy Projects, and Grassroots and Coastal Protection, most of our actions towards the environment, it is just us wanting to save the environment just because we need the environment for survival and not because we are part of the environment. This anthropocentric -a mentality that treats humanity as a central and most important being or entity of the world (The Editors of Encyclopaedia Britannica, n.d.) [1]- kind of mentality is the reason why humanity, even centuries of wanting to preserve environments, still fails. Our environmental consciousness should be upgraded to a kind of consciousness that sees humanity as part of the environment, this kind of consciousness called "biocentrism or deep ecology"(Naees, n.d.) [2] , and this kind of upgrade of consciousness should be equipped by the children. As childhood is best stage where children "learn critical social and emotional skills" and a partnership and "begin to develop interests that will stay with them throughout their lives" (National University, 2019) [3], teaching them environmental awareness and information in this stage may lead them to have foundation of interest and knowledge about environment that they would carry throughout their lives being the futures mind and actors. According to Wilson (1996) [4] that in fostering sustainable behaviors and attitudes that could contribute to a long-term ecological preservation, environmental awareness, especially on children, is an essential component.

Environmental education is not a new idea in the Philippines, since the government has already established rules and regulations that allow for its implementation into the Philippine education system, like the Republic Act No. 9512, or the Environmental Awareness Education Act of 2008, DepED Order No. 72, s.2003 also known as YES-O or the Youth for Environment in Schools Organization and DepEd Order No. 52, s.2011. And that according to UNESCO 2021 [5], there is still a gap in the integration of environmental education within primary school curricula. However, problems like "the absence of a sustainable and integral development program"(Turubal, 2021) [6], and "lack of education programs, curricula, or teaching strategies that engage learners to practice environmental protection and preservation"(Turubal, 2021) [6], especially leaning technique appears to lack environmental praxis. Portus (2024) [7] and Klement's (2025) [8] studies have shown that despite increased awareness of climate issues, a significant knowledge–action gap still exists among learner. This gap may due to the insufficient instructional strategies and engagement with experiential learning (Palmer, 1998) [9]. According to Tilbury (1995) [10] and Aribowo et al. (2025) [11] environmental eduation use traditional instructional method which remains theoretical and lack practical engagement. these methods only rely on rote learning rather than experiential enquiry (Tilbury, 1995) [10], limiting students ability to translate knowledge into action (Aribowo et al., 2025) [11]. Futhermore, environmental education improves knowledge and attitudes of learners, howerver, its impact on behavior is limited, suggesting the need to have a more effective approaches (van de Watering et al., 2022) [12]

To address the problem when it comes to effective pedagogy and instructional strategies, this study sought to develop an instructional toolkit grounded in John Dewey's educational philosophy, which emphasizes experiential learning, reflection, and real-world application (Dewey, 1938) [13]. John Dewey's pedagogy of learning proposes that the bases of education should be in active engagement with real-world issues which would allow learners to develop problem solving skills and personal investment in learning (Dewey,1916) [14]. This approach of learning is aligned with constructivist theories that argue that learning should be an active process and through experience

learners can construct knowledge (Piaget, 1950 [15]; Vygotsky, 1978 [16]). Applying these theories within environmental education can facilitate deeper cognitive and emotional connection with nature fostering a sense of responsibility towards the environment (Chawla, 2009) [17]. Lieflander et al (2013) [18] have stated in his research that this hands-on and inquiry based environmental experience would significantly enhance children's ability to internalize and apply environmental knowledge in practical contexts. Experiential learning is an essential learning strategy in environmental education as it connects theory with real-world action and problem-solving (NAAEE, n.d.). [19]

Thus the application of Deweyan pedagogy would help design an instructional toolkit intended to encourage students' environmental awareness through direct or hands-on experience and a toolkit that would bridge the gap of theory and praxis in environmental education. Furthermore, this study also aimed to assess how children's environmental awareness may vary between distinct ecological contexts — a rural-highland school (SMIS) and an urban-coastal school (CVES) — both located near dumpsite areas. Understanding these influences provides deeper insights on how place and experience shapes learners' environmental awareness. Thus, giving the study what kind of "basic" knowledge they have and designing the toolkit based on that knowledge. By integrating this study in Dewey's learning principle back up with empirical studies, this study could contribute to the broader discourse on effective environmental education strategies. This study will not only contribute to a broader educational discourse but will also touch the topic of sustainability.

This study aligns with Four Sustainable Development goals which are SDG 13 Climate action, SDG 14 life below water, SDG 15 life on land and SDG 6 clean water and sanitation. In relation to SDG 13, the study will contribute specifically target 13.3 "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning" by developing an instructional toolkit that will foster deep environmental awareness to learners this will help cultivate a person aware of a sustainable action and relationship with the environment. For SDG 14, the study will address Target 14.1 "prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution", as one of the study locale is located in Santiago, Iligan city- a dumpsite situated near a coastal area, where waste from the dumpsite and nearby resident can be wash to the sea which could directly threatens marine ecosystem. In connection to SDG 6, the study supports target 6.3 "improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally" , considering that waste accumulation in both study areas poses risk to nearby water sources, Santiago (coastal water) and Bonbonon (waterfalls). Lastly, for SDG 15, the study is aligned with target 15.1 "ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements", particularly in Bonbonon, Iligan City located near a waterfall-where improper waste management affects land ecosystem and the surrounding biodiversity.

Research Gap

While various studies have explored environmental awareness and practice among learners around the world, there is limited research on the gap between theories and practice in environmental education. Furthermore, there are also limited studies exploring the development of a learning strategy through experiential pedagogy and environmental philosophy.

Objective of the Study

The objective of this study is to assess children's environmental knowledge which will become the basis in developing a Dewey-inspired toolkit that promotes experiential learning in environmental education.
Specifically, the study aims to:

1. Determine the current level of environmental awareness among learners in Cabili Village Elementary School and Sultan Mamarinta Panandigan Integrated School paradigm Integrated School in terms of their knowledge, attitudes and environmental practices.
2. Identify the key factors that affect children's environmental awareness. Such as: socio-cultural, educational, and experiential influences.
3. Integrate John Dewey's principle of experiential learning in developing the instructional toolkits for environmental education.
4. Design an instructional toolkit that is grounded to John Dewey's principle of learning - experiential learning or progressive learning.

Theoretical Framework

The study would like to utilize two theories but Dewey's Learning principle or pedagogy of learning would be the main theory and Arne Næss's deep ecology theory would stand as a supplementary theory to strengthen the claim of the study when it comes to environmental awareness and consciousness. These theories would help provide a strong theoretical foundation in assessing children's environmental awareness and in developing a Dewey-inspired instructional toolkit.

Arene Naes Deep Ecology Theory

Arne Naes, an environmental philosopher who introduced deep ecology that promotes a holistic and intrinsic view of nature. Deep ecology is unlike shallow ecology or anthropocentric ecology which focuses on resource conservation for human benefit, deep ecology sees all living beings as possessing inherent value. Arne Naess's Deep Ecology talks about Biospheric Egalitarianism which emphasizes that humans are not superior to nature and that all organisms in the world have equal rights to live. This idea would help the study develop a toolkit that would teach children to respect all life forms and identify the rights of ever living things (Naess, 1986) [20]. Naess's deep ecology encourages personal connection with the environment and that awareness must translate into action. Where Næss's (1989) [21]claims that emotional connections form the basis for empathy and potential ecological action and he calls it "personal identification with nature". Thus, deep ecology can be supplementary theory supporting John Dewey pedagogy learning that centers on experiential learning. Furthermore, this theory will be specifically used in assessing students environmental awareness and identifying students current environmental standpoint, are they anthropocentric or are they biocentric. Identifying their current standpoint is essential to the study because this where the study would draw a foundation on what environmental topics and themes to be included on the toolkit to achieve or develop a deep ecological standpoint to the learners.

John Dewey's Educational Theory

John Dewey philosophy on education is centered on what we call experientialism or progressive education, this pedagogy focuses its emphasis on experiential and inquiry-based learning. Dewey claims that the purpose of education is not to make students as a "passive recipients of establish knowledge" but as "the cultivation of thoughtful, critically reflective, and social engage individual" (Hargreaves, n.d.) [22]. "...Informational statements about things can be acquired in relative isolation by any one who previously has had enough intercourse with others to have learned language. But realization of the meaning of the linguistic signs is quite another matter. That involves a context of work and play in association with others…" (Dewey, 1916) [14]

Dewey's pedagogy suggests that children learn best when they are not just a passive receive information but when they are actively engaged with their environment. Dewey rejected the rote-learning approach and child-centered approaches because he believes that these approaches followed the students' uninformed interest and impulses uncritically (Hargreaves, n.d.) [22]. Dewey sees the traditional subject

matter as important but it should be aligned with the strengths and interests of the learner. Thus, Dewey's idea of aligning interest of the student on the subject matter will be used in assessing children's environmental awareness between distinct ecological contexts — a rural-highland school (SMIS) and an urban-coastal school (CVES) — both located near dumpsite areas, as this ecological context may give a distinct interest of learners and see whether interest really have a great influence on acquiring knowledge and putting this on action.

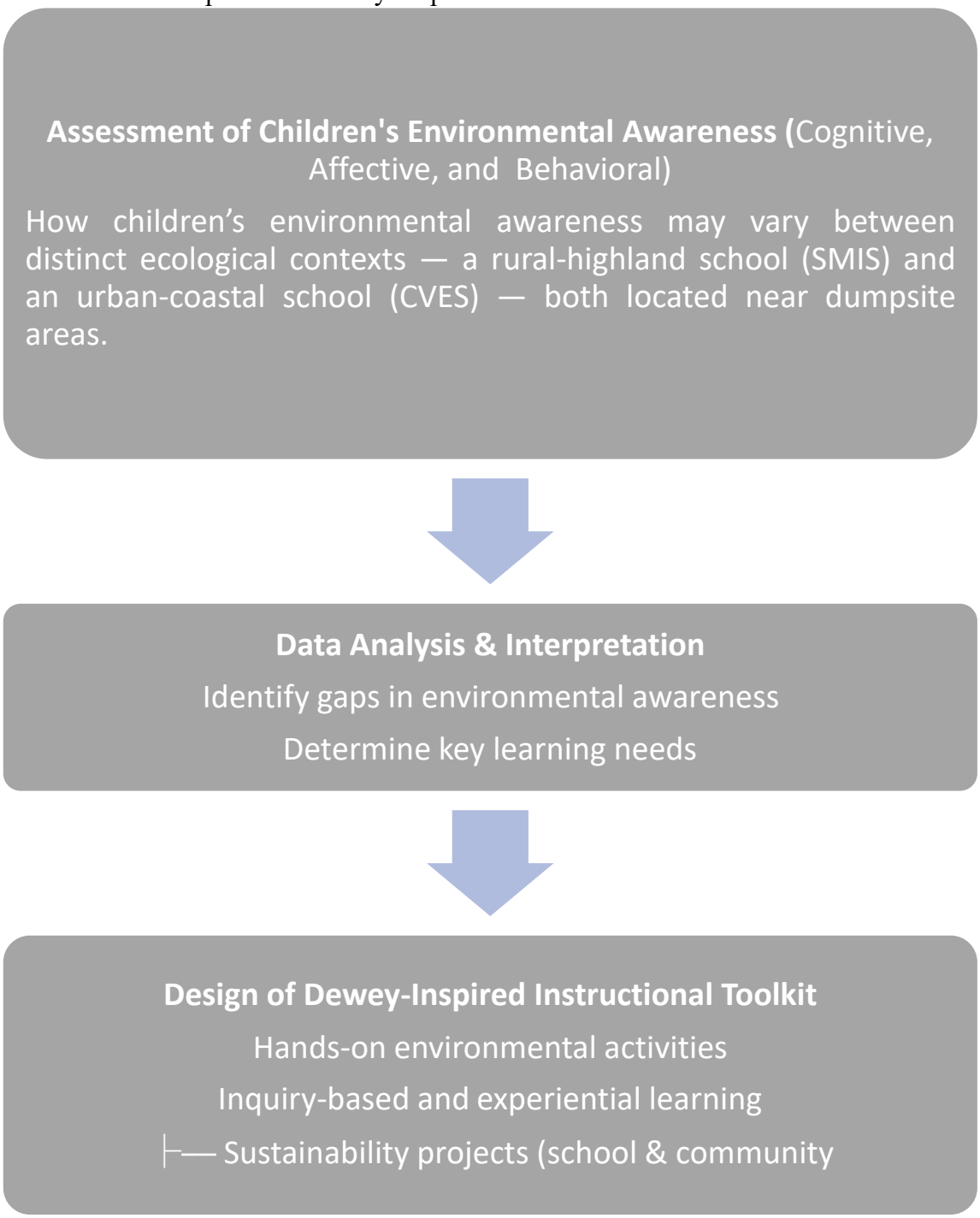
The study will utilize three key aspects of Dewey's theory and that is learning through experience (education should be rooted in real-world experiences), Reflective Thinking and Inquiry-Based Learning (critical thinking, where children explore environmental problems, ask questions, and develop solutions), and Education for Social Responsibility (education as a means to cultivate active citizens who contribute to the well-being of their communities). The integration of Dewey's experiential learning approach and Næss's deep ecology perspective would help the study develop an instructional toolkit that encourages learners engage in an interactive experience-based learning. The developed instructional toolkit would aim to help learners to have a reflective inquiry by encouraging them to ask questions (may it be environmentally related or not). Thus, the toolkitis designed to encourage the development of holistic ecological awareness and respect for all living things. Moreover, this theoretical framework ensures that the instructional toolkit for environmental education is experiential, ethical, and action-driven, equipping children with the knowledge and values needed for lasting environmental stewardship.

Conceptual Framework

The conceptual framework for the study "Assessing Children's Environmental Awareness: Foundations for Dewey-Inspired Instructional Toolkits" Integrates key Educational and environmental theories to analyze children's understanding of environmental issues and develop effective instructional materials. This study is grounded in two key theoretical frameworks: John Dewey's Experiential Learning and Arne Naess Deep Ecology. To assess children's environmental awareness, the study evaluates learners' knowledge in terms of environmental concepts, attitudes and emotions towards the environment, and the learners willingness to engage in environmental practice.

The study will develop an instructional toolkits based on John Dewey's experiential learning and Arne Næss's deep ecology, which aims to incorporate a hands-on activities like field observations and eco-games. The instructional toolkits are designed to encourage learners to have a reflective inquiry through storytelling and problem-solving. The toolkit will also aim to encourage learners to have an active participation when it comes to environmental and sustainability initiatives at home and within the community. The anticipated outcomes of the study include the potential enhancement of learners' environmental awareness and having a strong ethical relationship and responsibility with the environment. And the implementation of environmental education practices grounded in experiential learning strategies to reinforce environmental stewardship in school and communities.

Flowchart: Development of Dewey-Inspired Instructional Toolkit



1.5 Statement of the Problem

Sustainable development is a Global Goal that aims to have a sustainable practice to achieve a sustainable future. Environmental awareness and bridging the gap between environmental theories and practice is crucial to achieve sustainable development. However, the gap between theory and practice in environmental education is still a problem as current learning approaches lack the necessary tool or strategy to instill long-term and deep environmental connection. Despite the integration of environmental education in the Philippine education system, there is still a gap when it comes to the strength of implementation and learning strategies.

This study aims to assess children's environmental awareness which would then become the basis in developing Dewey-inspired instructional toolkits which promote experiential learning and critical thinking in environmental education. Specifically this study aims to answer the following question:

1. What is the current level of environmental awareness among learners of Tomas Cabili Village Elementary School and Sultan Mamarinta Panandigan Integrated School terms of Knowledge, attitudes and practice?
2. What are the factors influencing children's environmental awareness, including socio-cultural, educational, and experiential factors?

a. What uniqueness can be observed in the level of environmental awareness between learners from Tomas Cabili Village Elementary School (urban-coastal) and Sultan Mamarinta Panandigan Integrated School (rural-highland), both situated near dumpsite areas, in terms of knowledge, attitudes, and practices?
b. What context and experiential factors may explain the observed uniqueness in environmental awareness between Tomas Cabili Village Elementary School and Sultan Mamarinta Panandigan Integrated School ?

3. What pedagogical implication can inform the development of a Deweyan-inspired instructional toolkit for environmental education?

By addressing these questions, this study aims to provide empirical data that will guide the development of experience-based instructional materials aligned with Dewey's Learning Principle. The findings will contribute to enhancing environmental education strategies, ensuring that children not only learn about environmental issues but also develop the skills and motivation to take meaningful action.

1.6 Significance of the Study

The study is significant as it provides insight into Children's environmental awareness and contributes to the development of effective instructional strategies grounded in John Dewey's experiential learning philosophy. The findings will have implications for various stakeholders, including educators, curriculum developers, policymakers, parents, and researcher.

For Educators – The study will help teachers understand children's existing environmental awareness levels. The developed instructional toolkits may help teachers implement hands-on, inquiry-based learning. Which may enhance learners' engagement and foster a deeper connection with environmental issues.

For Curriculum Developers – The study will offer a new educational framework that integrates experiential learning into environmental education. In this way lessons are not only theoretical but also practic which would encourage active participation and real-world application.

For Policymakers - The research findings can inform educational policies and programs focused on environmental education, supporting initiatives that promote sustainability and environmental consciousness among young learners.

For parents and Guardians- Understanding children's environmental awareness can help parents reinforce environmental values at home, fostering eco-friendly habits and behaviours beyond the classroom.

For Researchers - The study will contribute to the existing body of knowledge on environmental education, providing a foundation for further research on instructional innovations and the effectiveness of experiential learning strategies in promoting sustainability

By addressing the gap in children's environmental awareness and developing relevant instructional materials, this study aims to enhance environmental education practices, ultimately shaping a generation of environmentally responsible individuals and achieve a sustainable future.

Scope and Delimitation of the Study

This study focuses on assessing children's environmental awareness as a foundation for developing Dewey-inspired instructional toolkits aimed at enhancing environmental education through experiential learning. The study will primarily examine children's knowledge, attitudes, and practice related to environmental awareness and while also identifying socio-cultural, educational, and experiential factors that shapes their awareness. The target participants of the study are Grade 5 and 6 elementary students aging 10-12 years old. The study will be conducted

in Sultan Mamarinta Panandigan Integrated School, Bonbonon, Iligan City and Tomas Cabili Village Elementary School, Santiago, Iligan City, where both schools are located near dumpsites. Based on the findings, the study will design a prototype of Dewey-inspired instructional toolkits aimed at enhancing environmental education through experiential, hands-on learning activities.

This study has several delimitations that may affect the scope and applicability of its findings. It will focus solely on children aging 10 - 12 in Grade 5 and 6 from Sultan Mamarinta Panandigan Integrated School, Bonbonon, Iligan City and Tomas Cabili Village Elementary School, Santiago, Iligan City, which may limit the generalisability of the results to a much broader population. This study is limited in two Elementary School which are both are located near dumpsite areas, where Sultan Mamarinta Panandigan Integrated School is a located in a rural highland area and Tomas Cabili Village Elementary School is located in an urban-coastal area, this will allow the study for a comparative analysis of environmental awareness among children exposed to different ecological and socio-cultural context. Additionally the research will examine environmental awareness but will not assess long-term behavioural changes following the use of instructional toolkit. The methodology will rely primarily on surveys, interviews and observation , without incorporating experimental intervention to measure the toolkits effectiveness. Furthermore, the study will be grounded in Dewey's experiential Learning Framework and will not explore other educational philosophies or pedagogical approaches in depth. Despite this limitations, the study aims to provide a meaningful insights into children's environmental awareness and contribute to the advancement of environmental education through an innovative, experience-based learning strategies

1.8 Definition of Terms

This section provides both conceptual and operational definitions of key terms used in the study.

Environmental awareness
Conceptual Definition: Refers to a person's understanding of the environment. Which includes the person's understanding on the cause and solutions of environmental issues and a person's knowledge of sustainable practices and ecological responsibility (UNESCO, 2021) [5].
Operational Definition: In this study environmental awareness is defined as the children's knowledge, attitudes, and behaviours toward environmental issues through surveys and interviews.

Experiential Learning
Conceptual Definition: Experiential learning is a learning process where individuals acquire knowledge through direct experience, reflection, and application, as proposed by Dewey (1938) [13] and later expanded by Kolb (1984) [23].
Operational Definition: This study applies Dewey’s experiential learning framework in developing instructional toolkits that engage children in hands-on environmental activities.

Instructional toolkits
Conceptual Definition: Instructional toolkits are structures sets of educational resources, including lesson plans, activities, and materials, designed to support teaching and learning (Merrill, 2002) [24].
Operational Definition: The Instructional toolkits in this study consist of interactive, experiential-based activities intended to promote children's environmental awareness in school settings.

Sustainability
Conceptual Definition: Sustainability refers to meeting present needs without compromising the ability of future generation to meet their own needs, as defined by the Brundtland Report (WCED,1987) [25].
Operational Definition: In this study, sustainability is understood as children's ability to recognize and practice environmentally responsible behaviours in their daily lives.

Dewey-inspired Instruction

Conceptual Definition: Dewey-inspired Instruction is an educational approach that emphasizes active, inquiry-based, and experience-driven learning as advocated by John Dewey (1938) [13].
Operational Definition: This study incorporates Dewey's Principle into environmental education by designing activities that encourage children to engage with real world environmental problems through hands-on learning experience.

Ecological Literacy
Conceptual Definition: Ecological literacy refers to an individual's ability to understand the principles of ecological systems and apply that knowledge to make informed decisions that support environmental sustainability (Orr, 1992) [26].
Operational Definition: In this study, ecological literacy is assessed based on children's ability to recognize environmental problems and propose appropriate actions for sustainability.

Environmental Education
Conceptual Definition: environmental education is a process that enables individuals to explore environmental issues, engage in problem-solving and take action to improve the environment (UNESCO, 1977) [27]
Operational Definition: This study examines how environmental education is implemented in selected elementary schools and how it influences children's environmental awareness.

Inquiry-Based Learning
Conceptual Definition: Inquiry-based learning is an educational strategy where students develop knowledge through questioning, exploration, and investigation of real-world problems (Hmelo-SIlver et al., 2007) [28].
Operational Definition: The study incorporates inquiry-based learning in the instructional toolkits by encouraging children to ask questions and explore solution to environmental challenges.

Child-Centered Learning
Conceptual Definition: Child-Centered learning is an educational approach that prioritised students interest, experience, and active participation in the learning process (Dewey, 1902) [29].

Operational Definition: The Instructional toolkits that will going to develop in this study are designed to be Child-Centered, ensuring that activities align with children’s interests, cognitive abilities and real-world experiences.

These additional terms provide clarity on key concepts and frameworks that guide the study, ensuring a comprehensive understanding of its objectives and methodologies.

REVIEW OF RELATED LITERATURE

This literature will present the current condition of environmental education in the Philippines. The literature will also present the problems present in environmental education in the Philippines. Thus, presenting this will give the idea on how environmental education is needed in the Philippines and why it is the Children who should be the subject of this education. The literature then will define what is environmental awareness and consciousness. And will discuss John Dewey and Arne Naes and how their theory fits to be the basis for the development of the Toolkit.

Philippines and its Environment

According to Myer (2009)[30], deforestation, soil erosion, disturbance of hydrological systems, over-exploitation of fisheries, loss of coral reefs, and extinction of species are all examples of environmental degradation in the Philippines.Aside from that, the country is also considered as one of the most vulnerable to the effects of natural disasters in the world (USAID;World Risk Index as cited by Mina 2021), as the country's placement is along the path of tropical storms brewing in the western Pacific as well as the Ring of Fire (Mina 2021). [31] Reason why the country must become more environmentally resilient and capable of coping with and recovering fast from natural calamities (USAID) [32]. Agriculture, fishery, and forestry contribute for around 10% of GDP and about 30% of employment in the Philippines, hence natural resources are vital. Natural capital is also significant since it provides electricity, water, flood control, storm mitigation, and other environmental services to the entire country, including cities (USAID) [32].

One of the highlighted environmental problem in this study is waste management. Both the study locale is situated near dumpsites. According to Creencia (2017) [33] Iligan generates more or less 165 tons of waste everyday, given this amount of waste Iligan City is seen to fail in terms of waste management. The implementation of waste management in Iligan City, as stated by (Cuizon 2012) [34] in his study, is not consistent across the 44 barangays and highlighted that there is a need for improvement on the programs and community participation in terms of waste management. Araña et al. (n.d.) [35] evaluated that the implementation of the Ecological Solid Waste Management Act (RA 9003) Iligan City has a gap when it comes to enforcement and compliance at the barangay level, thus, indicates challenges in implementation and monitoring in waste management. In school level, the study of Magdugo et al. (2024) [36] have shown that students have strong institutional effort when it comes to waste management, however still requires continuous engagement.

One of the initiative of the local the local government of Iligan City is its Central Material Recovery and Composting Facility (CMRCF) -a waste processing system, this waste management project aims to have a sustainable and City-wide waste management (City Government of Iligan, n.d.) [37]. However, according to Creencia (2017) [33], waste management fails because of factors like poor waste facility design, weak information campaigns and mismanagement of the waste facility. Ellos (2025) [38] claims resident behavior affects plastic waste generation and suggests that the Local Government of Iligan City should have a better sustainable waste management system. Environmental education is needed to instill environmental awareness to the young learners of Iligan City as the problem of environmental degradation is not something that should be taken lightly, especially waste management.

Environmental education in the Philippines

Environmental education in the Philippines is not new where in fact there are policies enacted in line with this. The Republic Act No. 9512, or the Environmental Awareness Education Act of 2008, was enacted in response to a United Nations declaration on climate change, the law requires the three educational agencies – DepEd, CHED, and TESDA – to integrate environmental education into all subject areas, use various teaching strategies to introduce environment education to learners, and enable students to develop their own sense of values and commitment to solve problems and make decisions concerning the environment in collaboration with other agencies such as DENR and DOST (Republic Act No. 9512, 2008) [39]. Another is DepED Order No. 72, s.2003 also known as YES-O or

the Youth for Environment in Schools Organization, an avenue for students to do environmental actions such as tree-planting activities, clean-up drives , and other environmental activities in the community (DepEd Order No. 72, 2003) [40]. Furthermore, in light of strengthening environment education in public and private schools DepEd lunches DepEd Order No. 52, s.2011, which necessitates effective school-based activities that promote, protect, and preserve the environment (DepEd Order No. 52, 2011) [41]. While, on the tertiary level, some higher education institutions have started to offer environment-related courses; most HEIs have integrated environment protection into the NSTP courses; others, especially the private HEIs, even conduct community and extension programs regarding environment protection (Tarubal, 2021) [6].

The problem of environmental education in the Philippines

According to Tarubal (2021) [6], there are two main problems with environmental education in the Philippines, first is "the absence of a sustainable and integral development program". The Philippines has always been at the core of several ecological catastrophes, owing to both human and natural forces, the reason why development that is both sustainable and integrated, as well as genuine for the greater benefit is a great need (Aguas, 2019) [42]. According to Esa (2010) [43], educational institutions must work harder to prepare their students for a sustainable future and that teachers have the greatest impact on preparing children and teenagers to be future environmental leaders. However, according to Tarubal (2021) [6], policies such as integrative environmental education would be pointless if they were not accompanied by other policies and programs aimed at improving employment and social welfare.

The second problem with environmental education in the Philippines is the "lack of education programs, curricula, or teaching strategies that engage learners to practice environmental protection and preservation" (Turubal, 2021) [6]. According to Punzalan (2020) [44], the result of assessment of the senior high school students' environmental awareness and practices revealed that while they had a high level of environmental knowledge, they were lacking in environmental praxis, in where, as a result, he advocated for school-based programs and activities that raise both the degree of environmental knowledge and the level of practice in resolving environmental issues and promoting sustainable development.

Ecological Awareness in Filipino Education Students

According to Project Learning (n.d.) [45], "environmental education provides important opportunities for students to become engaged in real world issues that transcend classroom walls. They can see the relevance of their classroom studies to the complex environmental issues confronting our planet and they can acquire the skills they'll need to be creative problem solvers and powerful advocates". According to Tarubal (2021) [6], forming students' minds and equipping them with skills will not only raise their awareness, but will encourage them seek alternatives when they have to make key decisions when dealing with the environment around them. For instance, the student who resorted to kaingin to make a living, if taught properly, could instead find an environment-friendly, alternative means of living.

One way to promote environmental awareness is to incorporate environmental education throughout the curriculum (Hollweg et. al., 2011; Burns and Kavacs, 2014 Tomar, 2017) [46] [47] [48]. One way to accomplish this, according to Hadzigeorgiou and Skoumios (2013), is through a pedagogical approach that keeps the natural environment front and center during the teaching-learning process. Recent studies have examined the environmental awareness and practice among Filipino students particularly on highschool students and they have notice a consistent pattern of students to be aware of the ecological issues, particularly in caring and practical competency which levels of this awareness are influenced by socioeconomic factors (Lualhati et al., 2018) [49]. Moreover, students generally demonstrate good to very high levels of environmental awareness but their environmental practice appears to be in a poor to moderate level (Punzalan, 2020; Escatron et al., 2023; Galorio and Naling, 2024; Buot and Manalo, 2024) [44] [50] [51] [52]. While students recognize their obligation to conserve the environment and preserve finite resources, there remains room for improvement in addressing environmental change and promotimg outdoor

activities (Escatron et al., 2023) [50]. The disparity between awareness and practice is particularly evident in the concept of nutrient cycling, where students show high awareness in attitude but low awareness in knowledge and practice (Buot & Manalo, 2024) [52]. These findings highlight the need for developing and implementing effective environmental education programs and instructional materials that aim to bridge the gap between awareness and practice, ultimately fostering sustainable behaviors among students (Punzalan, 2020; Galorio & Naling, 2024) [44] [51]. *"Learning about… environmental processes feeds into… appreciation for nature and… environmental protection*." (Ante, n.d.) [53]

The gap between awareness and practice is also seen to be a result of the least competent pre-service elementary student teacher in terms of ecological foundation (Panganiban-Lualhati, 217) [54]. Filipino pre-service elementary teachers showed varying of competencies across different environmental education content areas (Panganiban-Lualhati, 217) [54]. however, in the study of Garcia and Cobar-Garcia's (2018) [55] shows that elementary teachers particularly in Manila and Nueva Ecija Province have "scored very low on environmental issues and climate change" (Garcia & Cobar-Garcia, 2018) [55]. In India, a study of Basic Education Teacher trainees revealed that most possessed moderate levels of environment competencies, with significant differences based on gender and education background (Kumar and Rani, 2021) [56]. According to Garcia and Cobar-Garcia (2018) [55] this may be result that most of the teachers teaching environmental education may have taken at least one to none environmental science course during their undergraduate/graduate studies, being not active in participating environmental groups, and not being too invested on reading publications and news about the environment may cause the incompetencies of elementary teachers. These findings underscores the importance of enhancing environmental education in teacher training programs to improve overall competencies. "…there is a need for curriculum development of pre-service teacher education leaning toward the pedagogy to improve the teaching of science, i.e., science process skills; on the assumption that RA 9512 is strictly implemented" (Garcia & Cobar-Garcia, 2018) [55]. Teacher competencies directly affect how children engage in environmental activities; hence, designing Dewey-inspired toolkits for children must consider teacher facilitation skills.

Cultivating Environmental Consciousness in Filipino Youth

Environmental consciousness in Filipino children can be developed through various educational approaches. Study of Lualhati et al. (2018) [49] have shown that Filipino education students demonstrate ecological awareness, particularly in caring and practical competency. Outdoor experiences play a crucial role in raising environmental consciousness by connecting people to their environment, fostering care, and building agency (Nazir & Pedretti, 2016) [57]and that outdoor recreation and nature based experiences significantly support youth development, including environmental awareness and social/psychological well being (Aphamis, 2025) [58]

Workshops that engage children in visualizing and designing their ideal world can help evaluate and improve their environmental consciousness (Guller and Tukuc, 2020) [59] . Moreover, a study shows that school gardens used with early childhood would enhance children's environmental and scientific skills (Canon-Vargas, Melo-Mora and Sosa, 2025) [60]. According to Collado et al. (2020) [61] nature exposure is more effective in terms of instilling good environmental attitude than traditional instructions. In the Philippines, efforts to promote environmental education are not only centered to learners but are also implemented in teacher training programs through curriculum guides and various instructional strategies (Lopez, 2020) [62]. Moreover, nature-based environmental education improves children's environmental attitudes, however, behavior change is seen to be moderate which highlights both the potential and limitations of environmental education (Agarwal, et al., 2024) [63]. These approaches in promoting environmental education collectively contributed in the formation of environmental consciousness in Filipino children. Focusing on care, knowledge, and action to promote environmental participation. However there is still a need for enhanced environmental education programs in schools to improve student's environmental awareness and practices. Studies recommended to implement a information dissemination programs in environmental education, institutionalizing environmental advocacies, and develop training modules to strengthen environmental competencies among students and future teachers (Lualhati et al., 2018; Punzalan, 2020; Rogayan & Nebrida, 2019; Panganiban-Lualhati, 2017) [49] [44] [64] [54].

The aim of implementing environmental education is to awaken the awareness of the student on environmental matters, and being aware means bein [63]g conscious. But what is environmental consciousnes? According to Pachmama Alliance (n.d.) [65] , environmental consciousness is to understand the fragility of our environment and the importance of its protection. And that to define environmental awareness we must first understand the environmentalist movement. Environmentalism is an ideology that evokes the necessity and responsibility of humans to respect, protect, and preserve the natural world from its anthropogenic (caused by humans) afflictions (Pachmama Alliance, n.d.) [65]. According to Zelezny and Schultz (2000) [66] "*environmental consciousness' refers to specific psychological factors related to an individuals' inclination to engage in pro-environmental behaviours of various kinds. This leads to a 'change of heart' such that the individual now views the Earth to restore it through his experience and education rather than as a resource to be exploited*".

And if we constitute environmental consciousness on the lenses of production and consumption, consumers who care about environmental well-being, according to Abkar and Hosta (2013) as cited by Aragao (2021) [67], have changed their lifestyles, shifting from an immediate and individual-focused type of consumption to one that considers the collective interests, thinking in the long term and in the longevity of the planet's natural resources, as a result, the development of ecological consciousness could be regarded as a shift from the former to the latter, with a greater emphasis on collective issues. As we are all accountable for environmental damage, it is critical that everyone enhance their environmental consciousness, to guarantee that future generations' lives are safe, it is especially important to teach youngsters about the need for environmental awareness. As things stand, our actions will have the greatest impact on future generations, in which we must provide our children with the tools they need to be environmentally responsible and educated (DeltaNet International, n.d.). [68]"Environmental awareness is an integral part of the movement's success. By teaching our friends and family that the physical environment is fragile and indispensable, we can begin fixing the problems that threaten it" (Pachmama Alliance, n.d.) [65]. According to Mathur and Kumari (2013) [69], "People who show high values in the affective dimension of environmental consciousness, or those who have environmental information identify with ecological beliefs about human-environment interaction. They have an altruistic or biospheric attitude and express feelings of moral obligation and engage in pro-environmental behaviours to a greater extent than those who have an egoistic attitude." There are several resources available to enhance environmental awareness and education, including group learning (inside or outside of the classroom), instructional and inspiring seminars, online courses, books, articles, films, and brochures, to name a few, stay up to date on environmental news, read books and other resources, and learn about the issues affecting your own community, as it is much easier to talk to others about the environment if you've already taken the time to educate yourself (Pachmama Alliancen, n.d.) [65].

Furthermore, the result of assessment made by Mathur and Kumari (2013), showcase the relation of the kind of attitude of the person towards the environment and the kind of community it belongs to. According to Mathur and Kumari (2013), "urban respondents exhibit egoistic attitudes while suburban participants who are in close contact with nature show biospheric attitudes. Significant correlations are seen between egoistic attitude and value of self-enhancement (0.73) in case of urban participants and between biospheric attitude and the value of self-transcendence (0.59) for suburban participants. This is probably because the value of Self transcendence is a form of environmental consciousness which may develop into Higher Consciousness". Where, even the knowledge and practice of waste management is seen to different according to the person's socioeconomic status (Cuizon, 2012) [34].

The need of understanding Naess's deep ecology and environmental consciousness

Two of the most important concepts that are related to environmental care and our present ecological situation are sustainable development and integral ecology (Aguas, 2019) [42]. The things that children should understand in terms of the environment should be biocentric and not anthropocentric. Why? As Madsen, (n.d.) [70], argue that anthropocentrism, a worldview that includes an instrumentalist view of nature and sees humanity as the conqueror of nature, has resulted in environmental degradation around the world, and that it should be replaced with ecocentric (ecology-centered) or biocentric (life-centered) worldviews, in which the biosphere is the primary concern.

This paper aims to change the anthropocentric and "the shallow ecology movement" (as Næss calls it; is the "fight against pollution and resource depletion", the central objective of which is "the health and affluence of people in the developed countries") into a biocentric and "deep ecology movement"(endorses "biospheric egalitarianism", the view that all living things are alike in having value in their own right, independent of their usefulness to others) (Stanford Encyclopedia of Philosophy, 2015) [71], through developing an instructional toolkit. According to Mathur and Kumari (2013) [69], "the process of change in outlook is called ecological conversion. The individual understands that human estrangement from the natural world has given rise to its destruction without conscience. The individual realizes the need for renewing and restoring the Earth because it belongs to God, because it is our home and provider of our needs and must not be exploited. This leads to the development of an intimate interconnectedness, balance and harmony with nature. The observation of the Earth and Universe as sacred and acknowledging the beauty, complexity and fragility of the Earth with awe and wonder is Higher Consciousness".

John Dewey's Pedagogy Of learning

William James, John Dewey, Kurt Lewin, Jean Piaget, and Carl Rogers are among the major twentieth-century researchers who contributed to Experiential Learning Theory. These philosophers promoted education as learner-centered, emphasizing the importance of experiences in learning (Kolb & Kolb, 2012). [72] As per the result of Punzalan (2020) [44] assessment of the senior high school students' environmental awareness and practices revealed that students lacking in environmental praxis and his advocacy for a school-based programs and activities that raise both the degree of environmental knowledge and the level of practice in resolving environmental issues and promoting sustainable, is saying much of promoting an experience-base education.John Dewey (1987) [73], in his book My Pedagogic Creed emphasizes the importance of children learning via experiences. Dewey (1897) [73] outlined the educational system in which he reduced the goals of individual education and advocated the notion of social interaction and group learning as a teaching and learning approach for the current American educational system he also argued that instructors should actively involve pupils in the experiential learning process, setting the highest standards for teaching in complicated social situations. The importance of John Dewey cannot be stressed, as Kolb's experiential learning theory is founded on Dewey's work, particularly on the importance of experience in the learning process. (Clark, Threeton & Ewing, 2010) [74].

> *"I believe that ideas (intellectual and rational processes) also result from action and devolve for the sake of the better control of action. What we term reason is primarily the law of orderly or effective action. To attempt to develop the reasoning powers, the powers of judgment, without reference to the selection and arrangement of means in action, is the fundamental fallacy in our present methods of dealing with this matter. As a result we present the child with arbitrary symbols. Symbols are a necessity in mental development, but they have their place as tools for economizing effort; presented by themselves they are a mass of meaningless and arbitrary ideas imposed from without. I believe that the image is the great instrument of instruction. What a child gets out of any subject presented to him is simply the images which he himself forms with regard to it (Dewey, 1987).* [73]*"*

John Dewey viewed the system of education as a sophisticated blend of different disciplines and the role of teacher as a selfless person in society. Early education is generally established to have a significant impact on the brain development of children. Children learn best when they are not pushed too hard and are allowed room to express themselves (Mrunal, 2018) [75]. Most childhood education experts agree that young children learn best when they aren't pushed too hard, (have opportunities to connect with their peers, and are treated with kindness by their parents and teachers) children learn best when instruction and educational activities make up a tiny part of their daily routine (as being apart from their parents for long periods of time is not healthy for young children)and having an unskilled teachers and big class sizes, are reasons why children frequently do not learn (Loveless, 2026) [76] and also "trust or building trust — and studies have shown that when children are comfortable and trust the people around them, they learn more quickly and successfully" (National University, n.d.). [77] Furthermore, An intervention study among primary school aged children (5–11 years) have showed that integrating active learning

and environmental biology experiments within a formal curriculum increases environmental awareness and intention to act (Bulbert et al., 2025) [78]. Furthermore according to Bulbert et al. (2025) [78], active and experiential approach increased students' environmental awareness and strengthened their willingness to engage in environmental practices.

Synthesis

The reviewed literature has shown that environmental education on Filipino children has a critical role in addressing the growing environmental problems in the Philippines. Environmental Awareness is considered to be one of the factors responsible for fostering good environmental education among Filipino Children, however, it reveals that there is a consistent gap between environmental knowledge and environmental practice among children. While children demonstrate a high level of environmental knowledge, this does not consistently translate to willingness to engage in environmental practices. Thus, this gap underscores the fact that cognitive understanding on environmental concepts is not enough to foster sustainable engagement in environmental practices.

In the Philippines, the intensified urgency to strengthen environmental education is because of the ongoing environmental issues such as deforestation, waste management and its vulnerability to natural disasters. The implementation of Environmental policies in the Philippines education system is seen to be uneven and limited in curriculum design, program sustainability, and contextual relevance. Socioeconomic factors also emerge as a significant basis on the extent to which level environmental knowledge is translated into practice, thus, highlighting the need for more inclusive educational approaches.

The literature has also highlighted the importance of experiential learning in bridging the gap between knowledge and action. Which is drawn from John Dewey’s educational philosophy that emphasizes active participation, reflection, and real-world engagement as essential components to have an effective education. This idea is further complemented with Arne Naess environmental philosophy which claims that there should be a shift of consciousness from anthropocentric to biocentric, which according to Naess’s would foster a deeper sense of connection between human beings and the natural environment. Studies mentioned in the literature have supported this theoretical framework by demonstrating that structure, experience-based environmental education can significantly enhance children's environmental attitude, awareness and engagement. This approach not only strengthen children's environmental knowledge but also seen as effective in strengthening children’s good behavior towards the natural environment. Thus, claiming that environmental education should shift from traditional, classroom-based approach of learning to a more holistic, participatory and experience based learning strategy.

Moreover, these findings put educational institutions as one of the vital agents of fostering an environmentally responsible citizen through an effective environmental education. Developing an instructional toolkit grounded in John Dewey’s experiential leaning principle and Arne Naess’s Deep Ecology offers a promising path in addressing the existing gap between knowledge and practice in environmental education.

RESEARCH DESIGN AND METHODOLOGY

This chapter presents the research design and methodology to be employed in this study. This includes the research setting, sampling procedure, data gathering procedure, research instruments,and statistical statement.

Research Design

This study uses qualitative and quantitative research design, specifically, a developmental research design to assess children's environmental awareness and develop a Dewey-inspired instructional Toolkit. In assessing children's environmental awareness, participatory research approaches will be use to ensure that children actively engage in the assessment process rather than being passive respondents. These approaches align with John Dewey's experiential learning theory, which emphasizes learning through experience and reflection.

Below are key participatory approaches that are be utilized in this study:

Surveys and Interviews

Aged appropriate survey questionnaires -picture based- and structured interviews are used to evaluate the students knowledge, attitudes, and behaviours regarding environmental issues. Students are then encouraged to freely express their thoughts using interactive tools like pictures and drawings about the environment that will help them articulate and communicate their ideas.

Focus Group Discussion (FDGs) with Children

Small group discussions are conducted to facilitate peer learning and collective knowledge-building among participants, which will allow students to explore their perception and practices related to the environment. This will help the study identify common themes in children's environmental awareness and behaviours.

Storytelling and Role-Playing

Students are encouraged to dramatize or storytell their knowledge and perception of the environment, including environmental issues and practices. This method will help the study to identify the students conceptual understanding of the environment and the emotions connected to this.

Observation and Eco-walks

The students will participate in guided eco-walks, this will allow students to have an opportunity for an experiential learning through observation and discussions of the environmental conditions they observe during the walk. Students will record their observations on a paper and share this with the facilitators. This method provide insights into how experiential learning activities may influence learners' engagement and understanding. Thus, helping the study develop a more realistic experience-based toolkit.

Participatory Mapping and Drawing Activities

Students are instructed to create drawings and maps to visually represent their understanding of the environment and local ecological challenges. This method will allow students to express their perceptions of environmental issues and share their thoughts on the things they see as potential solutions of these issues non-verbally and creatively. Children capture will draw the environment outside their house they will storytell or explain what they draw. In this way the study will identify what are the common environmental features and problems they have. Through this learners will express their perspective about their environment.

By integrating these participatory methods, the study ensures that children play an active role in the research process. These approach align with Dewey's experiential learning principles, making the assessment process more meaning, engaging, and reflective of children's lived experience.

Sampling Procedure

The study will utilize purposive sampling and stratified sampling as a sampling procedure. The study will purposely target young learners aging 10-12, from Sultan Mamarinta Panandigan Integrated School and Cabili Village Elementary School. Purposive sampling is used to identify children who meet specific age and participants criteria, ensuring that they can actively engage in the activities. Meanwhile, stratified sampling categorised participants according to their school, allowing for a diverse range of developmental perspectives in assessing environmental awareness. This approach enhances the study's ability to capture variations in understanding and engagement across different genres levels.

Target Population

The target population of this study is consist of all elementary learners aging 10-12 years old from Sultan Mamarinta Panandigan Integrated School and Cabili Village Elementary School.

Name of School	Number of students
Sultan Mamarinta Panandigan Integrated School	124 students
Cabili Village Elementary School.	157 students
Total	281 students

Inclusion and Exclusion Criteria

To ensure a proper selection of the participants, the study follows a specific criteria on what kind of participant is included and excluded in the data gathering procedure.

Children must be between 10 and 12 years old and enrolled in either Sultan Mamarinta Panandigan Integrated School, Bonbonon, Iligan City and Cabili Village Elementary School, Santiago, Iligan City. Parental or guardian consent must be provided, and participants should express a willingness to engage in interactive environmental awareness activities. Children with severe cognitive or speech impairment that may hinder their participation are considered to be excluded in the data gathering procedure the same with children whose parents or guardians do not provide consent will not be included in the study. These criteria help maintain the integrity and feasibility of the research while ensuring ethical considerations are met.

Ethical considerations

The study adheres to strict ethical guidelines to ensure the well-being and comfort of all participants. Before participation, parents or guardians must provide informed consent, while researchers seek verbal and non-verbal assent from the children to respect their autonomy. A child-friendly approach is employed, designing research activities to be engaging, age-appropriate, and non-intimidating. Confidentiality is also a priority, with participants' identities kept anonymous and all collected data used strictly for research purposes.

3.3 Data Gathering Procedure

The data collection process is designed to be child-friendly, interactive, and participatory, ensuring that children aged 10 to 12 can meaningfully engage while maintaining ethical and developmental appropriateness. The study will integrate multiple participatory research instruments to assess children's environmental awareness using both qualitative and quantitative approaches.

Preparatory Phase

The study follows a strict ethical and preparatory process to ensure the safety, well-being, and meaningful participation of young learners. Ethical clearance and permissions are obtained by seeking approval from the institute Research Integrity and Compliance Office, DepEd, school principal, and teachers. Additionally, informed consent from parents or guardians is required, along with verbal assent from the learner who is participating in the study as a respect to their autonomy. Facilitators are experienced and equiped with essential knowledge of basic child rights, proper child handling, and age-apropriate communication to ensure a safe and supportive research environment, especially, this study aims to gather learners' perspectives without the facilitators interventions. To refine the methodology, a pilot testing phase is implemented, involving the facilitator, college students and 10 learners aging 10-12 years old. This step ensures clarity, engagement, appropriateness for young participants, allowing for necessary adjustments before full implementation.

Data Collection Phase

The study employs a multi-method approach that integrates inquiry-based and participatory research tools to assess learners' environmental awareness in an engaging and developmentally appreciated manner. Child-appropriate surveys and interviews involve pictures, structured interviews, simple questions, and story-based questioning. Responses are transcribed and coded for thematic analysis. through field notes. These participatory methods ensure that learners can actively contribute to the study, making the assessment process aligned with experiential learning principle.

Data Analysis and Interpretation

The study employs a comprehensive data analysis and validation process to ensure the accuracy and reliability of findings. Qualitative data collected through focus group discussions (FGDs), drawings, storytelling, ang observations. This data undergoes thematic analysis to identify patterns in childrens environmental awarenes, perception and attitudes.

Quantitative data, gathered through surveys and ecowalk checklists, is analyzed using simple statistical methods such as frequency and percentage calculations to measure levels of environmental knowledge and behavior. To enhance the credibility of results, triangulation is applied by comparing data from multiple instruments, ensuring validity and reliability.

Post-Data Collection Phrase

The result are then integrated into Dewey-inspired instructional toolkit, designed to enhance environmental education through engagement, experience-based learning materials tailored to children's development needs. Finally, ethical data storage and confidentiality measures are strictly followed, ensuring that all recorded responses, drawings, and other data are securely stored and anonymized to protect participants identities and maintain research integrity.

3.4 Research Instrument

To effectively assess the current environmental awareness of learners from Sultan Mamarinta Panandigan Integrated School and Cabili Village Elementary School and develop an instructional toolkits inspired by John

Dewey's educational philosophy, this study employs a combination of qualitative research instruments to measure learners knowledge, attitudes, and behavior regarding environmental coconcept. Survey questionnaires (age-appropriate, visual, story-based), semi-structured interviews, FGDs, observations, draw-and-tell, performance-based assessments (role-playing) will be used.

Survey questionnaires serve as a primary data collection tool, these questionnaires include multi-choice questions assessing factual knowledge on environmental topics such as pollution, climate change, and biodiversity. Questionnaires also include likert-scale questions measuring environmental attitudes and behaviors; and picture-based questions which enables learners to express thier thoughts on the environment. The semi-structured interviews and focus group discussions (FGDs) will be conducted to explore children's perception and emotional connections to the environment and would also help the study in identifying learners' preferred learning methods. Classroom and outdoor observations will assess real-life environmental behaviors, including reactions to environmental story telling or lessons. The draw and tell activity will allow learners to illustrate their understanding of environmental concepts through drawing, which they will then explain to research ers, providing qualitative insights into thier perception and values. Futhermore, performance-based assessments like roleplaying environmental problem-solving scenarios, will evaluate learners ability to apply environmental concepts in real-life situations. Through all this research instruments, the study aims to provide a understanding of the learners environmental knowledge which will contribute in designing an effective, experiential and inquiry based environmental instructional toolkit.

3.5 Data Analysis

To analyze the data collected from various research instruments, the study use a mix-method approach. Integrating both quantitative and qualitative methods to ensure a understanding of learners current environmental awareness that will help in the development of Dewey-inspired instructional toolkits. Quantitative data, derived from questionnaires, observation checklists and performance based assessment will be analyzed using descriptive statistics. Descriptive statistic, will determine overall awareness score and will provide insights into multiple-choice and Likert-scale responses. Qualitative data from interviews, focus group discussions (FGDs), draw-and-tell sessions, and content analysis of learning materials will be examined through thematic analysis. Pattern recognition will be applied to analyze how learners' environmental awareness is influenced by their home, school, and community environment. The findings will be mapped to Dewey's learning principle to align themes with experiential and inquiry-based learning principle. Visual content analysis will be conducted to evaluate learners drawing and explanations to uncover thier perceptions of environmental issues. to ensure validity and reliability, triangulation will be employed by comparing survey data with observational findings to verify self-reported behaviors and Focus Group Discussions results with quantitative data to identify consistencies or discrepancies, and aligning learners drawings with their survey responses to assess coherence in their survey responses to assess coherence in their environmental perceptions. By integrating these analytical techniques, the study will provide both measurable insights and deeper interpretative understanding of learners current environmental awareness, ultimately guiding the development of experiential, inquiry-based, and problem-solving learning strategies in accordance with Dewey's learning principle.

3.6 Ethical Considerations

This study involves children who are considered a vulnerable group, strict ethical consideration will be observed. Prior to participation, informed consent will be obtained from parents or guardians, while children will be provided with age appropriate assent form to ensure voluntary participation. All research tools and activities will use child-friendly language, visuals, and participatory methods to minimize stress while ensuring enjoyment. Activities will be conducted in safe and familiar settings such as classrooms or within the school premises under the supervision of teachers or guardians. When a child displays discomfort or unwillingness, they will be allowed to withdraw without any consequence. To uphold confidentiality, learners' identities will be protected through pseudonyms and

secure data handling. The research will also adopt culturally sensitive and gender-responsive approaches to ensure inclusivity. Through this the study ensures that learners participation remains safe, ethical, and empowering while fostering environmental awareness in line with Dewey's experiential pedagogy and the Arne Naess deep ecology

Measures to mitigate the risks

To ensure ethical participation of children, the study will provide appropriate remuneration in the form of non-monetary tokens such as school supplies and educational materials that both recognize their contribution and support their learning. All activities will be conducted in a conducive environment that fosters active engagement through child-friendly methods such as storytelling, roleplay, nature observation. Moreover, a safe environment will be guaranteed by holding sessions in secure familiar settings (e.g., classroom and school premises) under the supervision of teachers and guardians. This is done in accordance with the study's commitment to protect children's welfare while cultivating deep environmental awareness.

Disclosure of Conflict of Interest (COU)

The researcher hereby declares that there is no conflict of interest in the conceptualization, conduct, and potential publication of this study. The study solely for academic purposes and is not influenced by any financial, personal, or organizational interests. No external funding agency, commercial entity, or stakeholder has exerted influence over the design, methodology, analysis, or expected outcomes of this study.

Data Protection Plan

All data collected in this study will be treated with strict confidentiality. Personal identifiers of child participants will be removed and placed with codes. Digital files will be password protected and stored in device accessible only by the researcher and copy will be kept away from accessibility of anyone. Data will be retained for five years for academic purposes and will be destroyed after. Information shared in reports or publication will be presented in an aggregated form to ensure anonymity and participants privacy.

Discomfort and inconveniences

The study anticipates minimal discomfort and inconveniences, which will be addressed by using child-friendly and participatory (active) activities, while ensuring that participation is voluntary and learners may withdraw anytime they want.

Compensation and /or medical treatment in case of injury

In the unlikely event of injury during activities, participants will be provided with immediate medical treatment and appropriate compensation to ensure their safety and well-being.

RESULTS AND DISCUSSION

This chapter presents, analyzes, and interprets the findings of the study in relation to the stated problems. The results are organized according to each research question to ensure clarity and alignment with the Statement of the

Problem. Data were gathered from learners of Sultan Mamarinta Panandigan Integrated School (SMPIS) and Cabili Village Elementary School (CVES), representing rural-highland and urban-coastal contexts, respectively.

4.1 Level of Environmental Awareness

This section answers the first research problem: What is the current level of environmental awareness among learners of Tomas Cabili Village Elementary School and Sultan Mamarinta Panandigan Integrated School in terms of Knowledge, attitudes and practice?

4.1.1 Environmental Knowledge

This subsection shows the learner's environmental knowledge that is based on the data gathered through participatory approaches utilized by this study, specifically the picture-based surveys and interviews. Level of environmental knowledge is identified using their ability to identify environmental concepts like environmental issues, the cause and effect of human and natural environment relationship, and their understanding and usage of scientific words. This finding will help the study showcase the "knowledge" dimension of awareness.

Table 1
Distribution of Performance Levels in Environmental Knowledge

Criteria	Performance Level	SMIS (f)	SMIS (%)	CVES (f)	CVES (%)
Identification of Environmental Issues	4	5	4.03%	7	4.46%
	3	114	91.94%	120	76.43%
	2	5	4.03%	30	19.11%
	1	0	0.00%	0	0.00%
Cause-and-Effect Relationships	4	110	88.71%	115	73.25%
	3	5	4.03%	30	19.11%
	2	4	3.23%	12	7.64%
	1	0	0.00%	0	0.00%
Use of Scientific Terms	4	0	0.00%	2	1.27%
	3	119	95.97%	145	92.36%
	2	5	4.03%	10	6.37%
	1	0	0.00%	0	0.00%

*Performance Level: 4- Excellent, 3-Proficient, 2-Developing, 1-Beginning

The results of the picture-based survey are further reinforced by the distribution of performance levels (correct answer) in basic environmental concepts presented in Table 1. The findings show that both schools demonstrated strong awareness of basic environmental concepts. However, notable differences emerged in the depth and accuracy of students' explanations during the Cause and Effect interview.

In terms of identifying basic environmental issues- deforestation, flood, improper waste disposal, and water and air pollution- both learners from Sultan Mamarinta Panandigan Integrated School and Cabili Village Elementary School showed strong performance, with the majority identified to be on the "Proficient level". However, 19.11% of Cabili Village Elementary School learners are at the "Developing level" compared to the 4.03% of Sultan Mamarinta Panandigan Integrated School. While this finding underscores that both groups of learners are knowledgeable in identifying basic environmental issues, Sultan Mamarinta Panandigan Integrated School learners showcased more levels of performance in this skill.

A clear difference between the two groups of learners have emerged during the examination understanding of cause-and-effect relationships common (interview) in the environment. For example, on the survey question asking "What do trees do for us?" and "What happens when we throw trash on the ground?", 88.71% of Sultan Mamarinta Panandigan Integrated School learners achieved "excellent level", thus, indicating that these learners have a strong knowledge and ability to clearly and correctly explain environmental processes. In contrast, only 73.25% Cabili Village Elementary School learners "excellent level", with (19.11%) in "proficient Level" and 7.64% at "Developing." This findings are align with the previous result stating that while Sultan Mamarinta Panandigan Integrated School learners are more likely to provide complete and accurate explanations on the cause-and-effect scenarios given to them, Cabili Village Elementary School learners only provided partial and incomplete responses, highlighting differences in depth of environmental education between the two schools.

Furthermore, in terms of the use of scientific terms, both learners from both schools fell within the "Proficient" level (95.97% in SMPIS and 92.36% in CVES), with a very few achieving "Excellent" level (0% in SMIS and 1.27% in CVES). This finding shows that both groups has a limited knowledge in terms of precise scientific terminologies in environmental education. This gap underscores that although foundational knowledge in environmental concepts are present there is still a need to strengthen learners' knowledge on environmental science, which would help learners articulate their knowledge and understanding of their environment more confidently and accurately. Thus, the three survey results reveal that while both schools demonstrate strong fundamental knowledge of environmental issues, scientific vocabulary and deep casual reasoning skills still lacks. Moreover, the difference between knowledge in identifying basic environmental issues and the articulation of the cause and effect may be due to different physical environmental and environmental exposure.

These findings highlight that while learners are at the Proficent Level in identifying environmental issues, their understanding remains largely at a surface level. Dewey's claim that *"education is a process of living"* [73]suggests that knowledge must be grounded in experience to become meaningful. Futhermore, these findings underscore the need for learning strategies that emphasize not just basic identification of environmental concepts and terminologies but will also focus on teaching students to analyze and reflect, and develop learners' willingness to engage on applying this knowledge into a practice. John Dewey's experiential learning strategies highlight these skills, allowing students to know through experience and reflection which may foster more holistic environmental awareness (Dewey, 1938) [13]. The findings suggest that learning instruction may benefit from shifting from simple identification of phenomena toward experiential inquiry—journals, outdoor observation, guided explanation, and explicit vocabulary enrichment—to support Dewey's view that knowledge emerges through action and reflection. At the same time, Naess' deep ecology perspective, which asserts that *"the well-being and flourishing of all life has intrinsic value,"* [20] points to the need for a more reflective and value-oriented form of environmental awareness. Together, these perspectives suggest that environmental education should move beyond identification toward experiential and reflective engagement.

4.1.2 Environmental Attitudes

This subsection shows learners environmental attitudes, based on the data gathered through participatory approaches utilized by this study, specifically Focus Group Discussions (FGDs), Storytelling and Role-Playing. Learners' environmental attitude is identified using their emotional responses, level of engagement and their individual behavior during the participatory activities. These attitudes reflect the learner's way of valuing and relating to their environment or surroundings, which is seen by this study as a crucial component in shaping their willingness to act on environmental issues. Aside from this these activities will also provide valuable insights on how children perceive environmental problems in line with their knowledge about it.

Table 2

Distribution of Performance Levels in Participation during FGDs and Storytelling Activities

Criteria	Performance Level	SMIS (f)	SMIS(%)	CVES (f)	CVES (%)
Engagement in Discussion	4	5	4.03%	30	19.11%
	3	115	92.74%	120	76.43%
	2	4	3.23%	0	0.00%
	1	0	0.00%	0	0.00%
Clarity of Expressions	4	0	0.00%	0	0.00%
	3	124	100.00%	150	95.54%
	2	0	0.00%	7	4.46%
	1	0	0.00%	0	0.00%
Respect for Others' Ideas	4	4	3.23%	17	10.83%
	3	5	4.03%	20	12.74%
	2	115	92.74%	120	76.43%
	1	0	0.00%	0	0.00%

*Performance Level: 4- Excellent, 3-Proficient, 2-Developing, 1-Beginning

During the FGDs, storytelling, and role-playing activities, learners from both Sultan Mamarinta Panandigan Integrated School and Cabili Village Elementary School expressed strong emotional responses to the environmental scenarios presented to them, such as: *"Have you ever seen someone throw trash on the ground? What did you think about it?"* and *"How do you feel when you play outside in a clean place?"* Responses consistently associated happiness with clean and green environments, while pollution and littering were linked to feelings of sadness and frustration. Common statements such as *"I like trees because they give fresh air"* and *"It's sad when people throw garbage in the river"* show that learners relate environmental conditions to their personal well-being. This suggests an anthropocentric orientation, where nature is valued primarily based on its benefit to humans.

At the same time, the facilitator observed that learners from both schools demonstrated what Arne Naess refers to as **"personal identification with nature,"** [20] as seen in their animated sharing of personal

experiences with their environments, such as playing outdoors or encountering polluted rivers and oceans. This indicates that while learners frame their responses in human-centered terms, they also show an emerging relational connection with nature. The quantitative results presented in the table further support these qualitative observations.

In terms of engagement, the majority of learners were rated at the "Proficient" level (92.74% in SMIS and 76.43% in CVES), indicating a consistent willingness to participate. Notably, a higher proportion of learners from Cabili Village Elementary School (19.11%) reached the "Excellent" level compared to only 4.03% from Sultan Mamarinta Panandigan Integrated School. This suggests that while both groups were engaged, CVES learners demonstrated a higher level of expressive participation. With regard to clarity of expression, most learners from both schools achieved the "Proficient" level (100% in SMIS and 95.54% in CVES). However, the absence of an "Excellent" rating indicates that responses were generally expressed in simple and less precise language, rather than more developed or analytical descriptions. This reflects a limitation in learners' ability to articulate their environmental understanding in more structured and scientific terms.

"Respect for others' ideas" emerged as an area for improvement, with the majority of learners in both schools falling under the "Developing" level (92.74% in SMIS and 76.43% in CVES). This highlights the need for more structured facilitation strategies that promote collaboration, reflective listening, and meaningful dialogue.

Overall, across both knowledge and attitude domains, learners demonstrate strong surface-level awareness and positive emotional connections to the environment. However, there are clear gaps in terms of depth of understanding, use of precise language, and reflective articulation. These findings suggest that while environmental awareness is present, it remains largely intuitive and emotional. Learners are able to value the environment, but they are not yet able to translate these feelings into critical or reflective discourse. Furthermore, the findings suggest differences in expression between the two groups. Learners from Cabili Village Elementary School (urban) displayed more expressive engagement, which may be influenced by exposure to more socially dynamic environments. In contrast, learners from Sultan Mamarinta Panandigan Integrated School (rural) showed more uniform but less expressive responses.

These results highlight the need for learning strategies that go beyond emotional expression toward more structured reflection and dialogue. This aligns with John Dewey's view that education is fundamentally a social and interactive process [73], where learners develop understanding through communication, shared experience, and reflection. In this sense, incorporating structured activities such as turn-taking, guided discussion, and reflective dialogue may help learners move from emotional awareness toward deeper, more critical environmental understanding.

Table 3
Distribution of Performance Levels in Participatory Mapping and Drawing Activities

Criteria	Performance Level	SMIS (f)	SMIS(%)	CVES (f)	CVES (%)
	4	10	8.06%	25	15.92%
	3	100	80.65%	107	68.15%
	2	14	11.29%	25	15.92%

Accuracy of Environmental Representation	1	0	0.00%	0	0.00%
Creativity and Effort	4	0	0.00%	0	0.00%
	3	115	92.74%	125	76.62%
	2	0	0.00%	5	3.18%
	1	9	7.26%	27	17.20%
Explanation of Drawing	4	5	0.00%	15	9.55%
	3	115	95.97%	135	85.99%
	2	4	4.03%	7	4.46%
	1	0	0.00%	0	0.00%

*Performance Level: 4- Excellent, 3-Proficient, 2-Developing, 1-Beginning

In addition to verbal expression through discussions and storytelling, learners' environmental attitudes were further examined through participatory mapping and drawing activities. These methods provided insight into how learners visually represent, reflect on, and interpret environmental concepts. Table 3 presents the distribution of learners' performance levels in these activities, which were evaluated based on three criteria: accuracy of environmental representation, creativity and effort, and explanation of drawing.

In terms of accuracy of environmental representation, the majority of learners in both schools were rated at the "Proficient" level (80.65% in SMIS and 68.15% in CVES), suggesting that most children were able to depict key features of their environment in a recognizable way. However, a greater proportion of Cabili Village Elementary School learners (15.92%) reached the "Excellent" level compared to 8.06% of Sultan Mamarinta Panandigan Integrated School learners. This indicates that CVES learners were more likely to produce more detailed and accurate representations. At the same time, CVES also had a higher percentage of learners at the "Developing" level (15.92% compared to 11.29% in SMIS), reflecting a wider variability in performance.

For creativity and effort, a similar pattern was observed, with the majority of learners in both schools rated at the "Proficient" level (92.74% in SMIS and 76.62% in CVES). This suggests that most learners demonstrated reasonable effort and some degree of creative expression. However, no learners from either school reached the "Excellent" level. Notably, a higher proportion of CVES learners (17.20%) were rated at the "Beginning" level compared to 7.26% in SMIS. This may indicate that while many learners were engaged, some—particularly from CVES—produced less developed or less imaginative outputs, possibly due to differences in motivation, exposure to creative tasks, or confidence in artistic expression.

In terms of explanation of drawings, most learners were rated at the "Proficient" level (95.97% in SMIS and 85.99% in CVES), indicating that they were generally able to describe the meaning of their work. A small proportion reached the "Excellent" level (five learners in SMIS and 9.55% in CVES), suggesting that some learners were able to provide deeper interpretations linked to environmental issues or personal experiences. However, most explanations remained basic and descriptive rather than reflective or analytical.

Overall, the results indicate that learners from both schools demonstrate strong baseline abilities in environmental representation and basic explanation. However, there are clear limitations in terms of creativity and depth of interpretation. Learners are able to represent the environment, but often struggle to

explain its broader meaning or significance. This pattern reflects what may be considered surface-level environmental awareness, where recognition is present but deeper reflection is limited.

From a theoretical perspective, this finding aligns with John Dewey's view that learning becomes meaningful when it is grounded in experience and reflection. While the drawing activities allowed learners to express what they see, the limited depth in explanation suggests that experience alone is not sufficient without guided reflection. As Dewey emphasizes, learning is not only about doing, but also about making sense of that experience through inquiry and dialogue.

At the same time, the findings can also be viewed in light of Arne Naess' concept of deep ecology. While learners were able to represent elements of their environment and express positive attitudes toward it, their explanations often remained focused on observable features rather than deeper ecological relationships. This suggests that their understanding has not yet developed into the kind of "deep" ecological awareness that recognizes the interconnectedness and intrinsic value of the natural world. Instead, their representations remain largely descriptive and, at times, implicitly anthropocentric.

A noticeable difference between the two groups also emerged. Cabili Village Elementary School learners showed greater variability, with some producing highly detailed and well-explained outputs, while others demonstrated minimal effort. In contrast, Sultan Mamarinta Panandigan Integrated School learners were more consistent, with most performing at the "Proficient" level but fewer reaching "Excellent." This suggests that differences in environmental exposure and learning contexts may influence both the detail and variability of learners' representations.

These findings suggest that while participatory mapping and drawing are effective in engaging learners and eliciting environmental awareness, they also highlight the need for more structured guidance. In line with Dewey's emphasis on reflective thinking and guided experience, these activities should be supported with questioning, discussion, and reflection. At the same time, incorporating prompts that encourage learners to think beyond human-centered benefits may help move their understanding closer to the deeper ecological perspective described by Naess. Thus, integrating guided questioning, reflection prompts, and thematic focus (e.g., *What threatens this place? What makes this place unsafe?*) may support learners in developing more critical, reflective, and ecologically grounded understanding.

4.1.3 Environmental Practices

This subsection presents learners environmental practice, which highlights their ability to apply environmental knowledge and attitudes in a real or simulated context. These findings were drawn from eco-walks observation and problem solving activities, which were designed to evaluate learners ability to observe natural environmental, reflect on their experiences, and express their insights through descriptive language.

Table 4
Eco-Walk and Observational Journal Results

Criteria	Performance Level	SMIS (f)	SMIS (%)	CVES (f)	CVES (%)
Observation Skills	4	0	0.00%	0	0.00%
	3	10	8.06%	10	6.37%
	2	109	87.90%	147	93.63%

	1	5	4.03%	0	0.00%
Reflection and Analysis	4	0	0.00%	0	0.00%
	3	110	88.71%	127	80.89%
	2	10	8.06%	25	15.92%
	1	4	3.23%	5	3.18%
Use of Descriptive Language	4	0	0.00%	0	0.00%
	3	120	96.77%	140	89.17%
	2	4	3.23%	17	10.83%
	1	0	0.00%	0	0.00%

*Performance Level: 4- Excellent, 3-Proficient, 2-Developing, 1-Beginning

The findings show that while most students demonstrated consistent participation and reached a basic level of proficiency, only a few exhibited higher-order skills such as critical analysis and detailed description. In terms of observation, the majority of learners were at the "Developing" level (87.90% in SMIS and 93.63% in CVES). This indicates that although students could identify common environmental elements—such as birds, trees, flowers, and fruits—their observations remained simple and surface-level rather than detailed or analytical. Only a small percentage reached the "Proficient" level (8.06% in SMIS and 6.37% in CVES), and none achieved the "Excellent" level. A small group in SMIS was even categorized at the "Beginning" level, suggesting minimal engagement in observation tasks.

This pattern reflects the idea of John Dewey that experience alone does not automatically lead to meaningful learning. While students are exposed to their environment, the lack of guided inquiry limits their ability to examine and interpret what they see. In this case, learners are able to notice their surroundings, but they are not yet engaging with them in a deeper and more reflective way.

In terms of reflection and analysis, most learners demonstrated a general understanding of their observations, with 88.71% of SMIS and 80.89% of CVES students classified as "Proficient." This suggests that students can form basic connections, such as linking littering to pollution or deforestation to flooding. However, a portion of learners remained at the "Developing" level (8.06% in SMIS and 15.92% in CVES), and none reached the "Excellent" category. This indicates that while students can reflect at a general level, their ability to critically analyze environmental issues remains limited.

From the perspective of Arne Naess, these findings suggest that learners have not yet developed a deeper ecological awareness. Their understanding appears to focus on observable environmental problems rather than a more meaningful sense of connection, responsibility, or ethical relationship with nature. This implies that current learning experiences support awareness but do not yet cultivate deeper ecological thinking.

Regarding descriptive language, most students were able to express their observations using simple terms, with 96.77% of SMIS and 89.17% of CVES classified as "Proficient." Learners commonly used basic descriptors such as "clean," "dirty," "green," and "beautiful." However, the absence of students in the "Excellent" level suggests that their ability to elaborate and use more precise or expressive language is still developing. A small percentage remained at the "Developing" level (10.83% in CVES and 3.23% in SMIS), indicating some difficulty in clearly articulating observations.

Overall, the results indicate that students can engage with their environment at a basic level, but their skills largely remain within the "Proficient" range. The lack of learners reaching the "Excellent" level across observation, reflection, and descriptive language highlights a clear gap between surface-level awareness and higher-order thinking skills. This suggests that while students are participating and learning, they are not yet being challenged to think more critically or express their ideas more deeply.

It is important to emphasize that the proposed toolkit has not yet been implemented, which helps explain why student performance remains at this level. Without structured strategies to guide inquiry and reflection, learners rely mainly on immediate experience, which does not consistently lead to deeper understanding.

These findings point to the need for more structured and intentional learning strategies, such as guided inquiry, reflective journaling, and group discussions. Such approaches align with Dewey's emphasis on guided experience and can help learners move beyond simple observation toward critical engagement. At the same time, integrating reflective and value-oriented activities can support the development of deeper ecological awareness, as emphasized by Naess. In practice, eco-walks should go beyond observation by incorporating structured questions such as: *Why is this here? Who caused it? Who is affected?* These prompts encourage learners to think more critically and reflectively. Through these strategies, students can gradually move from basic awareness to a more meaningful and engaged understanding of their relationship with the environment.

Table 5

Problem-Solving and Suggested Environmental Actions

Criteria	Performance Level	SMIS (f)	SMIS (%)	CVES (f)	CVES (%)
Identification of Solutions	4	0	0.00%	0	0.00%
	3	99	79.84%	120	76.43%
	2	20	16.13%	25	15.92%
	1	5	4.03%	12	7.64%
Practicality of Actions	4	10	8.06%	30	19.11%
	3	89	71.77%	100	63.69%
	2	20	16.13%	27	17.20%
	1	0	0.00%	0	0.00%
Personal Commitment	4	0	0.00%	0	0.00%
	3	104	83.87%	140	89.17%
	2	10	8.06%	7	4.46%
	1	10	8.06%	10	6.37%

*Performance Level: 4- Excellent, 3-Proficient, 2-Developing, 1-Beginning

To further assess whether environmental awareness extends beyond observation and reflection, the study also examined learners' ability to propose practical solutions to environmental issues. The results show that students from both schools were able to suggest common actions such as planting trees and cleaning their surroundings. However, these proposed actions often lacked specificity and feasibility. While learners

could identify what should be done, they were less able to explain how, when, or why these actions could be effectively implemented.

In addition, although personal commitment scores appeared high, many responses were largely declarative rather than actionable. This indicates that students demonstrate awareness and concern, but this does not consistently translate into concrete environmental practices. In this sense, the findings reveal a gap between awareness and praxis—students know what is right, but are not yet equipped to act on it meaningfully.

This reflects the idea of John Dewey that learning must move beyond passive understanding toward active and guided experience. Without structured opportunities to apply knowledge, learners remain at the level of intention rather than action. Similarly, from the perspective of Arne Naess, true ecological awareness involves not only recognizing environmental issues but also developing a sense of responsibility expressed through concrete actions. The absence of feasible and well-articulated solutions suggests that this deeper level of ecological engagement is still developing.

Overall, children from both schools demonstrate foundational environmental awareness shaped by their direct experiences within their respective environments. However, their skills tend to stop at recognition and emotional response rather than progressing toward analysis and agency. Learners from SMIS appear to show relatively deeper ecological reasoning, likely influenced by their rural exposure, while those from Cabili Village Elementary School display stronger expressive enthusiasm but a wider variation in performance. Despite these differences, both groups show common limitations in scientific vocabulary, reflective thinking, and the ability to propose feasible environmental actions.

These findings strongly support the need for a structured instructional approach. In particular, they justify the development of a Deweyan instructional approach-inspired toolkit that emphasizes experiential learning through eco-walk protocols, reflective processing through journals and guided questioning, integration of scientific vocabulary, collaborative discourse practices, and action-oriented project tasks.

It is important to note that this toolkit has not yet been implemented; however, its design directly responds to the gaps identified in Chapter 4. Thus, the toolkit should not be seen merely as a proposed output, but as a pedagogical necessity grounded in empirical evidence. By addressing the disconnect between awareness and action, it has the potential to support learners in moving from passive understanding toward active environmental engagement.

4.2 Factors Influencing Children's Environmental Awareness

This section answers the second research problem: What are the factors influencing children’s environmental awareness, including socio-cultural, educational, and experiential factors. It also examines the factors influencing children’s environmental awareness based on emerging patterns from the results in Section 4.1. The discussion is grounded on socio-cultural, educational, and experiential dimensions, interpreted through learners’ responses in focus group discussions, participatory activities, and observed performance trends.

4.2.1.1 Sociocultural Factors

The way learners interact with others plays an important role in how they understand and express environmental concepts. As shown in Table 2, during group discussions, learners from Sultan Mamarinta Panandigan Integrated School (SMIS) were mostly at the “Proficient” level (92.74%), with a small portion reaching the “Excellent” level (4.03%). In contrast, learners from Cabili Village Elementary School (CVES) showed 76.43% at the “Proficient” level and a higher proportion at the “Excellent” level (19.11%). This

suggests that SMIS learners tend to participate more consistently, while CVES learners appear to be more expressive and willing to elaborate during discussions.

However, in terms of respecting others' ideas, both groups showed a similar pattern, with the majority of learners remaining at the "Developing" level (92.74% in SMIS and 76.43% in CVES). This indicates that while learners are willing to share their ideas about environmental issues, many still struggle with essential discussion skills such as listening, turn-taking, and responding thoughtfully to peers. This gap highlights that participation alone does not necessarily translate into meaningful interaction.

These findings suggest that environmental awareness is not shaped by knowledge alone but is also influenced by the quality of social interaction. This aligns with the ideas of Lev Vygotsky [16] and Albert Bandura, who emphasized that learning occurs through dialogue, collaboration, and shared experience. From this perspective, the classroom becomes a social space where understanding is co-constructed rather than individually formed. When learners engage in meaningful discussion—where they not only express ideas but also listen, reflect, and respond—they are more likely to develop a deeper understanding of environmental concepts.

Overall, the results imply that strengthening learners' communication and interpersonal skills is essential in environmental education. Creating structured opportunities for collaborative dialogue, such as guided group discussions and peer feedback activities, can help learners move beyond simple participation toward more respectful, reflective, and meaningful engagement.

4.2.1.2 Educational Factors

School instruction also plays a significant role in shaping how deeply learners understand environmental concepts. As shown in Table 1, learners from both schools largely achieved the "Proficient" level in identifying environmental issues (91.94% in SMIS and 76.43% in CVES). However, a noticeable portion of Cabili Village Elementary School learners (19.11%) remained at the "Developing" level, suggesting less consistent understanding compared to learners from Sultan Mamarinta Panandigan Integrated School.

In explaining environmental processes, SMIS learners demonstrated stronger performance, with 88.71% reaching the "Excellent" level compared to 73.25% in CVES. This indicates that SMIS learners are more capable of explaining cause-and-effect relationships, such as how littering leads to pollution or how deforestation affects air quality. In contrast, many CVES learners still show partial or developing understanding in linking environmental causes and effects, pointing to a need for deeper conceptual support.

For scientific language use, both groups were mostly at the "Proficient" level (95.97% in SMIS and 92.36% in CVES), with very few reaching the "Excellent" level (0% in SMIS and 1.27% in CVES). This suggests that learners can communicate environmental ideas using simple terms but struggle to apply more precise scientific vocabulary. As a result, their ability to articulate more complex environmental concepts remains limited.

Similarly, Table 5 shows that in problem-solving tasks, most learners proposed common solutions such as cleaning the surroundings or planting trees (79.84% in SMIS and 76.43% in CVES). However, these responses were often general and lacked detail or practical feasibility. A portion of learners also remained at the "Developing" level (16.13% in SMIS and 15.92% in CVES), indicating difficulty in translating ideas into realistic and actionable solutions.

These patterns reflect John Dewey's view that learning becomes meaningful when knowledge is actively constructed through guided experience [73]. While learners are exposed to environmental concepts,

the findings suggest that instruction may not yet provide enough structured opportunities for deeper inquiry, reflection, and application. As a result, students are able to understand concepts at a basic level but struggle to extend this understanding into more complex reasoning and real-life action.

At the same time, from the perspective of Arne Naess, the results indicate that learners' environmental awareness remains largely at a surface level. Although they can recognize environmental issues and suggest general solutions, they have not yet developed a deeper ecological consciousness that involves critical thinking, ethical reflection, and practical engagement.

Overall, these findings suggest that while learners from both schools possess foundational environmental knowledge, there is still a need to strengthen reflection, scientific language use, and the application of knowledge in real-life contexts. This highlights the importance of more structured and intentional instructional strategies that can guide learners beyond basic awareness toward deeper understanding and meaningful environmental action.

4.2.1.3 Experiential Factors

Experience also plays a crucial role in shaping learners' understanding of environmental concepts. As shown in Table 4, most learners remain at the "Developing" level in observation skills (87.90% in SMIS and 93.63% in CVES). This indicates that while they can notice basic environmental features, their observations tend to remain simple and descriptive rather than detailed or analytical.
In terms of reflection and analysis, most learners reached the "Proficient" level (88.71% in SMIS and 80.89% in CVES), showing that they can make basic connections between what they observe and environmental issues. However, deeper analysis and critical thinking remain limited. These findings suggest that hands-on experiences, such as eco-walks and drawing activities, help learners become aware of environmental issues and support initial understanding.

This aligns with the idea of John Dewey that learning is grounded in experience. However, Dewey also emphasized that experience must be accompanied by reflection to become truly educative. In this case, while learners are actively engaging with their environment, the lack of structured reflection limits the depth of their understanding, keeping their responses at a descriptive level rather than moving toward analysis.

Related studies support this pattern, showing that integrating active learning and environmental biology experiments within a formal curriculum increases environmental awareness and intention to act and that experiential approaches strengthen students' willingness to engage in environmental practices (Bulbert et al., 2025) [78]. However, the present findings suggest that experience alone is not sufficient. Without guided reflection, these activities do not consistently lead to deeper conceptual understanding.
From the perspective of Arne Naess, this indicates that learners are developing awareness at a surface level but have not yet reached a deeper ecological consciousness. While they can recognize environmental elements and issues, they are not yet engaging with them in a more critical, reflective, and meaningful way.

Overall, the results highlight that experience is an essential starting point for environmental learning, but it must be supported by structured reflection and guided inquiry. Without these, learners' understanding remains descriptive rather than analytical, limiting their ability to fully engage with environmental concepts in a deeper and more meaningful way.

4.2.2 Observe uniqueness in in Environmental Awareness Between SMIS and CVES

This section presents the observed difference in children's environmental awareness between Sultan Mamarinta Panandigan Integrated School learners and Cabili Village Elementary School learners based on

the results presented in section 4.1. The discussion focussed on addressing SOP 2A, which examines the differences in the level of environmental awareness in terms of knowledge, attitudes, and practice. Unlike the previous section, which discussed the general factors influencing environmental awareness, this section will highlight how learners from the two schools differ in their responses, performance, and engagement across the identified domains.

4.2.2.1 Uniqueness in Environmental Knowledge

In terms of environmental knowledge, a large proportion of learners demonstrated proficiency in recognizing environmental problems and concepts, with most reaching the "Proficient" level. A smaller group of learners remained at the "Developing" level, indicating that while foundational understanding is present, some learners are still building consistency in their grasp of environmental ideas. A clearer pattern is seen in explaining cause-and-effect relationships, where many learners reached the "Excellent" level. This suggests that learners are able to explain how environmental issues are interconnected, such as linking human activities to environmental consequences. However, a portion of learners still provide partial or less detailed explanations, indicating that deeper understanding of environmental processes continues to develop.

In terms of scientific language, learners generally remain at the "Proficient" level. This shows that while they can describe environmental ideas, their use of scientific vocabulary is still limited. The absence of higher-level performance suggests a need for further support in expressing ideas using more precise and technical terms. The variation between general environmental knowledge and the ability to explain cause-and-effect relationships highlights an important point: these skills require not only understanding but also deeper reflection and personal engagement. Recognizing environmental issues involves basic comprehension, while explaining relationships requires interpretation and the ability to connect ideas. This supports the view of John Dewey that learning becomes meaningful when learners actively process and reflect on their experiences. Similarly, Arne Naess emphasizes that deeper ecological understanding develops through reflective and relational thinking about the environment.

Furthermore, as noted by Kollmuss and Agyeman (2002) [79], Rickinson (2001) [80], and Jensen (2002) [81], both internal factors (such as values, emotions, and personal reflection) and external factors (such as social and environmental context) influence how individuals process environmental knowledge. This suggests that differences in learners' understanding may be shaped by their experiences and learning environments, reinforcing that knowledge alone does not automatically lead to deeper understanding or meaningful action.

Overall, these findings indicate that while learners possess foundational environmental knowledge, the depth of their understanding varies. This highlights the need for instructional strategies that go beyond content delivery, focusing on reflection, conceptual connections, and the development of scientific language to support deeper environmental understanding.

4.2.2.2 Uniqueness in Environmental Attitudes and Participation between Schools

During the FGDs and storytelling activities, learner participation manifested varying levels of engagement across contexts. A large proportion of learners demonstrated proficient participation, with Sultan Mamarinta Panandigan Integrated School recording 92.74% at the "Proficient" level, while Cabili Village Elementary School likewise showed a substantial proportion at 76.43%. In addition, instances of "Excellent" engagement emerged more noticeably in Cabili Village Elementary School, suggesting the presence of learners who exhibit higher expressiveness and spontaneity in articulating ideas. Overall, the pattern indicates a general tendency toward consistent participation, alongside pockets of highly expressive learner engagement depending on individual learner disposition and interactional dynamics.

In terms of clarity of expression, both learning contexts reflect a generally similar distribution, with most learners performing at the "Proficient" level (SMIS 100%, CVES 95.54%), alongside a small proportion at the "Developing" level observed in Cabili Village Elementary School (4.46%). This suggests that while learners are largely able to communicate ideas with clarity, there remain isolated instances where articulation of thought requires further development. From a Deweyan perspective, this emphasizes learning as an experiential and communicative process where meaning is constructed through active participation and reflection in social settings. Likewise, in alignment with Naess' pedagogical creed grounded in deep ecology, the findings underscore the importance of nurturing relational sensitivity—where learners are guided not only to express ideas clearly but also to listen attentively and engage respectfully with the perspectives of others, reinforcing education as an interconnected and ethically responsive practice within the learning community.

4.2.2.3 Uniqueness in Environmental Practices and Application

In participatory mapping and drawing activities, learners from both learning contexts demonstrated a strong capacity to translate environmental concepts into visual representations. Sultan Mamarinta Panandigan Integrated School recorded a higher proportion of learners at the "Proficient" level (80.65%), while Cabili Village Elementary School showed a comparatively lower proportion at 68.15%, yet exhibited a slightly higher percentage of learners reaching the "Excellent" level (15.92%). This pattern suggests that while one learning context reflects more uniform and steady performance, the other presents a wider range of outputs that include more highly developed and refined representations. Rather than indicating superiority, this variation points to differences in how learners engage with creative interpretation and expression of environmental ideas.

When further disaggregated in terms of accuracy of environmental representation, Sultan Mamarinta Panandigan Integrated School maintained a higher concentration of learners at the "Proficient" level (80.65%), whereas Cabili Village Elementary School, while lower at 68.15%, continued to demonstrate a modest but notable proportion of "Excellent" outputs (15.92%). In terms of creativity and effort, a similar pattern emerges, with most learners from Sultan Mamarinta Panandigan Integrated School clustered at the "Proficient" level (92.74%), compared to 76.62% in Cabili Village Elementary School. This indicates a generally stable level of engagement in both contexts, with one leaning toward consistency and the other showing more variability in creative output.

For explanation of drawings, Cabili Village Elementary School recorded a slightly higher percentage of learners reaching the "Excellent" level (9.55%), suggesting instances of more elaborated and detailed articulation of visual work. Nevertheless, both contexts show that the majority of learners remain at the "Proficient" level, indicating that most are able to explain their representations adequately, although the depth and richness of explanation vary slightly across individuals.

In eco-walk and observational journal activities, both contexts show that a large proportion of learners are situated at the "Developing" level (SMIS 87.90%, CVES 93.63%). This indicates that while learners are able to identify basic environmental features, sustained observation and deeper environmental noticing remain emerging skills. From a Deweyan perspective, this reflects learning as an evolving process of experience, where observation gradually matures into reflective understanding through continued engagement with the environment. In parallel, Naess' deep ecology-informed pedagogical creed emphasizes that environmental learning should cultivate relational awareness—encouraging learners to move beyond surface-level identification toward a more connected and responsive way of seeing ecological systems as interdependent rather than isolated elements.

In terms of reflection and analysis, Sultan Mamarinta Panandigan Integrated School shows a slightly higher proportion of learners reaching the "Proficient" level, suggesting comparatively stronger reflective

articulation within this context. However, both groups still demonstrate similar developmental trajectories in their ability to process and internalize environmental experiences. For descriptive language, both contexts likewise converge at the "Proficient" level, indicating a shared baseline competence in articulating environmental observations.

Finally, in problem-solving and suggested actions, both contexts display a similar tendency to propose general solutions such as tree planting and cleanliness campaigns, indicating that environmental action ideas are still largely broad and conventional rather than highly specific or locally contextualized. However, Cabili Village Elementary School shows a slightly higher proportion of "Excellent" responses in terms of practicality of actions, suggesting more varied and occasionally more grounded proposals. Overall, the patterns across activities reflect not a hierarchy between learning contexts, but rather differing profiles of expression, consistency, and variability in how learners engage with environmental knowledge, experience, and action.

4.2.2.3. Uniqueness in Environmental Awareness (contextual and experiential factors)

This section will specifically answer SOP 2B, which focuses on the contextual and experiential factors that may cause for the observed differences in environmental awareness between learners from Cabili Village Elementary School and Sultan Mamarinta Panandigan Integrated School, as presented in Section 4.2.2. Unlike the previous section which described what differences may exist based on the learners environment, exposure, and lived experience.

4.2.2.3.1 Contextual Factors (School and Community Environment)

One of the key factors that may help explain variations in environmental awareness is the learners' surrounding environment. Kollmuss and Agyeman (2002), Rickinson (2001), and Jensen (2002) emphasize that social and environmental contexts significantly shape how individuals process information, construct understanding, and develop environmental awareness. In this sense, learning does not occur in isolation but is continuously mediated by lived experiences within specific ecological and social settings.

Both learning contexts are situated near dumpsite areas; however, their immediate environmental conditions differ in terms of exposure and daily interaction. Sultan Mamarinta Panandigan Integrated School, located in a rural-highland setting, is generally characterized by more open spaces, vegetation, and lower population density. Such conditions may support more stable patterns of attention and perception, which can be reflected in learners' relatively consistent responses and stronger performance in cause-and-effect reasoning tasks. From a Deweyan standpoint, these sustained encounters with a more stable natural environment may function as continuous experiential learning opportunities, where observation and reflection are gradually shaped through everyday interaction with relatively less complex environmental stimuli.

In contrast, Cabili Village Elementary School, situated in an urban-coastal environment, is marked by higher population density, mixed land use, and more visible environmental pressures such as waste accumulation and human activity. This setting may contribute to a more dynamic range of learner responses, where some learners demonstrate high levels of engagement and expressive environmental interpretation, while others exhibit more limited or surface-level responses. In line with Naess' deep ecology-informed pedagogical perspective, such a context also presents intensified opportunities for developing ecological awareness, as learners are directly confronted with environmental degradation and interdependence in more immediate and visible forms.

Overall, these contextual differences suggest that environmental exposure does not only influence levels of awareness but also shapes the ways learners process, interpret, and express environmental ideas. Learning outcomes, in this sense, are not solely a reflection of cognitive ability but are also deeply embedded in the lived ecological conditions that frame learners' everyday experiences.

4.2.2.3.2 Experiential Factors (Learning Experience and Exposure to Activities)

Another important factor is the learners' actual learning experiences, both inside and outside the classroom. Based on the results of the eco-walks and other participatory activities presented in Section 4.1, learners from both contexts were able to observe, identify, and describe a range of environmental concepts. However, most responses remained at a descriptive level, with limited evidence of deeper analytical processing. This suggests that while experiential learning opportunities are present, these experiences are not consistently translated into higher-order understanding or critical environmental interpretation.

From a Deweyan (1938) perspective, experience alone does not automatically result in meaningful learning unless it is accompanied by reflection. In this study, learners were able to see, notice, and describe environmental phenomena, but fewer were able to critically interpret or interrogate what they observed. This pattern may also help explain the similar limitations observed across both contexts in terms of scientific vocabulary use and depth of reflection. In other words, the challenge is not the absence of experience, but the insufficient structuring of reflective processes that would allow experience to be transformed into conceptual understanding.

Without guided reflection, questioning, and dialogical engagement, experiential activities risk remaining at a surface level of learning, where observation is not fully internalized into deeper environmental awareness. This aligns with the implication that meaningful environmental education requires not only exposure to ecological realities but also structured opportunities for learners to reflect, connect, and reconstruct meaning from their experiences in a more deliberate and critical manner.

4.2.2.3.4 Socio-educational Influence on Learning Development

The classroom environment and teaching approaches also play a significant role in shaping variations in environmental awareness. Based on the results, learners from both contexts demonstrated strong performance in the basic identification of environmental issues; however, performance was comparatively weaker in scientific explanation and deeper conceptual interpretation. This pattern suggests that instructional practices in both settings may place greater emphasis on foundational knowledge and recall rather than on higher-order thinking skills such as analysis, evaluation, and application.

This observation aligns with Tilbury (1995), who argues that environmental education becomes more meaningful when it extends beyond awareness-building and actively engages learners in critical thinking, participation, and transformative learning experiences. In the absence of a dedicated subject specifically focused on environmental education, environmental concepts are often integrated across multiple learning areas. While this interdisciplinary approach allows for exposure to environmental themes, it may also lead to fragmented understanding, where concepts are encountered in isolation rather than developed systematically and reflectively.

As a result, learners tend to develop general awareness of environmental issues but encounter difficulty in translating this awareness into structured reasoning, deeper explanation, or action-

oriented understanding. This highlights the importance of instructional design that intentionally integrates reflective questioning, inquiry-based activities, and opportunities for application, so that environmental learning progresses beyond recognition of issues toward meaningful understanding and informed action.

4.3 Pedagogical Implications for the Development of a Deweyan-Inspired Instructional Toolkit

The development of a Deweyan-inspired Instructional Toolkit emphasizes experiential, inquire-based and community engaged learning. The Develop Instructional Toolkit must emphasize experiential learning and inquire-based learning as the findings suggest that the traditional learning strategies are seen to be lacking in a depth articulation and understanding of environmental concepts and relationships and the strength to help students develop willingness to engage into environmental practice. That's why this study makes sure that the developed instructional toolkit will not lecture-focus but is interactive and guided inquiry-based. Findings have also shown that socioeconomic status and the environment the students belong to has an effect on how they perceive the environment and process environmental information. That's why the develop instructional toolkit should be locally grounded, including themes and topics that are locally relevant and relatable.

These Implications are expected to lead learners to learn their roles as a part of the environment - a manifestation of Arne Naess's Biospheric egalitarianism - and engage in communal environmental action. Aside from the developed toolkit the study suggests schools, community and institutions to give extra credit and support to clubs that are environmentally related and beneficial. Based on these principles, the researcher developed a Deweyan-inspired environmental education toolkit consisting of the following modules:

The first module "Nature and Me" aims to develop the knowledge and Inquiry skills of the learners. This module focuses on the question "what is my relationship with nature?" Through answering these questions the learner is expected to discover what is the environment, ecosystem and the natural resources independently-understands this concept using their own way of acquiring information through their observation on their relationship with the environment. Activities in this module include lectures, observations, drawing and reflection, this activities creates an interactive and inquiry-based learning. Module 2 "Seeing and feeling the Earth" aims to develop reflection and emotion of the learners towards the environment. Similar to the first module this module focuses on one question which is "How do my actions affect the environment?". In answering this question learners are expected to develop empathy for nature, understand the nature-human relationship and the cause-and-effect of these actions. And lastly module 3 "Acting for the Planet", aims to develop the sense of Responsibility & Citizenship of the learners. At the end of the module the learner is expected to understand Environmental care, civic responsibility, and sustainability through answering this question "What can I do to help?". Each module is designed for 1 week of activities (or 2–3 sessions), which is also designed to be adaptable for various subjects, given there is no subject designated only for environmental education.

4.3.1 Deweyan-Inspired Instructional Toolkit

The title of the develop Dewey-Inspired instructional Toolkit will be "LUNTIAN: Learning and Understanding Nature Through Inquiry, Action, and Nurture". Through the this toolkit learners are expected to not just develop awareness of the basic environmental concept but to have a critical, reflective thinking and empathy to the environment. Which would eventually lead learners to engage in environmental actions. This toolkit also expects to empower teachers to act as facilitators of experiential, reflective, and moral learning, fulfilling DepEd's goal of nurturing environmentally responsible and values-driven Filipino citizens.

I. Toolkit Overview

Purpose

The LUNTIAN Toolkit is designed to help teachers and students cultivate environmental consciousness through experiential, reflective, and community-based learning.

It bridges classroom knowledge and real-world ecological action, following John Dewey's principle that "We do not learn from experience… we learn from reflecting on experience."

Target Users
Primary Users: Grade 5–6 learners
Facilitators: Teachers in Science, Araling Panlipunan, and Edukasyon sa Pagpapakatao (EsP)

Duration: 3–4 weeks (flexible for classroom or project-based integration)

DepEd Alignment
Aligned with the Most Essential Learning Competencies (MELCs):
Science: Interactions of living things; ways of caring for the environment.
Araling Panlipunan: Human-environment relationships and community actions.
EsP: Demonstrates care, honesty, and responsibility toward others and nature.

II. Objectives and Learning Outcomes
General Objective

- To strengthen children's environmental consciousness through hands-on, reflective, and community-based experiences that integrate science, values, and social learning.

Specific Learning Outcomes
By the end of this toolkit, students will be able to:

- Identify and explain local environmental issues using appropriate vocabulary.
- Demonstrate empathy and moral awareness toward environmental challenges.
- Express creatively their understanding of nature through art, mapping, and storytelling.
- Engage in environmental actions that promote sustainability within their school or community.
- Reflect critically on their personal role in caring for the environment.

III. Structured Content

Module 1: Nature and Me (Awareness & Inquiry)
Key Concepts: Environment, ecosystem, natural resources
Focus Question: "What is my relationship with nature?"

Module 2: Seeing and Feeling the Earth (Reflection & Emotion)
Key Concepts: Empathy for nature, pollution, and balance
Focus Question: "How do my actions affect the environment?"

Module 3: Acting for the Planet (Responsibility & Citizenship)
Key Concepts: Environmental care, civic responsibility, sustainability
Focus Question: "What can I do to help?"

Each module is designed for 1 week of activities (or 2–3 sessions), adaptable for various subjects.

Expanded Content

MODULE 1: Nature and Me (Awareness & Inquiry) "We do not learn from experience… we learn from reflecting on experience." — John Dewey (1938, Experience and Education)	
Learning Objectives	Overview

<table>
<tr><td rowspan="2">By the end of this module, students will be able to:
Define “environment” and identify its components.
Observe interactions among living and non-living things.
Demonstrate curiosity through asking questions about nature.
Express their understanding through simple reflections or drawings.</td><td>This module introduces learners to the environment as an interconnected system. It helps them recognize their role in nature through observation, curiosity, and reflection — the foundation of environmental consciousness.</td></tr>
<tr><td>Key Concept: Environment and Interdependence
The environment is everything around us—living (plants, animals, humans) and non-living (air, water, soil)—that interact to sustain life. Environmental awareness begins when children understand that they are part of nature, not separate from it. According to NAAEE (2024), early exposure to environmental learning improves children’s empathy, problem-solving, and sense of responsibility.</td></tr>
<tr><td></td><td>Pre-Test (Optional)
Instructions: Answer the following before starting.
What is an environment?
Name one living and one non-living thing around you.
How do humans use nature?
Why should we care for our surroundings?
What is one thing you can do to help the environment?</td></tr>
<tr><td colspan="2">Introduction
The environment includes everything around us — air, water, plants, animals, and people. We depend on it for life. Learning about it helps us care for it better. This module follows Dewey’s idea that learning happens through experience and reflection. Students will explore, observe, and discuss their surroundings to build awareness</td></tr>
<tr><td colspan="2">Lecture / Concept Definition
What is the environment?
The environment is everything around us — the air we breathe, the land we walk on, the water we drink, the animals, plants, and even the weather. All these parts work together like a team to make life possible. When one part changes, it affects the others — that’s why we must take care of every part of our environment. (National Geographic Society, n.d.).

Why does it matter? Early exposure to environmental education supports cognition, attitudes and behaviours beneficial to the planet and to children’s development. (North American Association for Environmental Education, n.d.)

Focus: “What is my relationship with nature?” Encourage learners to reflect: how do they use natural resources, what do they notice in their surroundings, how are their lives dependent on and influencing environments. Key terms to define for learners: ecosystem, natural resource, biodiversity, human-environment interaction.
Structured Content
Heading: The Components of our Environment
Sub-heading: Living Things (plants, animals, humans)
Sub-heading: Non-Living Things (soil, water, air, rocks)
Heading: Interactions and Dependencies
Sub-heading: How plants and animals depend on each other and on non-living things
Sub-heading: How humans use and affect the environment
Heading: Inquiry Skills for Nature
Sub-heading: Observation (what do you see/feel?)
Sub-heading: Questioning (why is this here? what’s happening?)
Sub-heading: Recording (drawing, journalling, photographing)
Core Information / Tips for Teachers</td></tr>
</table>

Encourage students to ask open-ended questions during activities ("What do you notice?", "Why might this be so?", "How can we find out?"). Use local examples (trees in the school yard, nearby river, waste in the community) so students see relevance. Emphasise "I belong to nature" and "nature belongs to me" so they feel a connection rather than a distant subject. Provide scaffolding: initially model observation, then gradually allow students to design their own mini-questions.		
Learning Materials		Text excerpt: "The World Around Us" (teacher-provided or DepEd Science 5 MELC)
		Video: Interactions of Living Things (DepEd Commons or YouTube educational clip)
		Diagram: "Living and Non-living Things" chart
		Reading: "Why We Need Clean Air and Water" (DepEd AP 5 resource)
		Images: Local community photos or posters
Learning Activities	Activity 1: Eco-Discovery Walk	Instructions: Observe your surroundings (schoolyard, garden, or street). Record or draw three things you see — one living, one non-living, and one showing human impact. Discussion: What relationships do you notice?
	Activity 2: Nature Journal	Write or draw in your "Eco-Journal": What do I see? What do I feel? What questions do I have about nature?
	Activity 3: Mini Talk — "My Favorite Part of Nature"	Students share one observation or reflection to the class.
Assessments	Performance:	Observation checklist (Participation, Curiosity, Accuracy)
	Written:	Short quiz — Identify 3 components of environment, define "ecosystem."
	Reflective:	Journal rubric (Depth of observation, clarity of thought, connection to self).
For Further Study EPA Kids Environmental Activities: epa.gov/students DepEd Commons: Science 5 Lesson "Interactions in the Environment"		

National Geographic Kids — “Our Planet, Our Home” videos

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MODULE 2: Seeing and Feeling the Earth (Reflection & Emotion)

“Education is life itself.” — John Dewey (1916, Democracy and Education)

Learning Objectives
By the end of this module, students will:
Describe emotions connected to nature.
Reflect on how their actions affect the environment.
Demonstrate empathy and propose small, responsible actions.

Overview
This module deepens students’ understanding by connecting emotions with environmental care. Learners reflect on how their feelings and actions affect nature, aligning with Dewey’s principle that emotion drives meaningful thought.

Key Concept: Empathy and Emotional Connection to Nature
Environmental education develops both knowledge and compassion. Empathy helps students emotionally relate to nature and understand the consequences of human actions. Emotional connection fosters behavioral change (Cvetković et al., Sustainability, 2022).

Pre-Test (Optional)
How do you feel when you see trash in nature?
What happens if we don’t care for the environment?
Name a natural place that makes you feel peaceful.

Introduction
Caring for the Earth starts with feeling connected to it. Through stories, reflection, and emotional expression, learners will explore their sense of empathy for nature and how emotions can inspire positive action.

Lecture / Concept Definition
What is empathy with nature? Empathy in environmental education involves recognising the value of nature, connecting emotionally to living things, and caring about their well-being. Research shows that environmental education fosters emotional development and pro-environment behaviours. (naaee.org)

The human-nature relationship: Humans are not separate from nature; our actions affect natural systems, and in turn nature influences human life (air quality, water supplies, biodiversity). Understanding this relationship is part of environmental literacy. (Population Education)

Focus: “How do my actions affect the environment?” Lead learners to reflect on everyday actions (waste disposal, electricity, water usage) and the feelings connected (pride in caring, guilt in neglect).

Key terms to define: attitude, value, behaviour, empathy, stewardship, environmental responsibility.

Structured Content
Heading: Emotions and Values in the Environment
Sub-heading: Caring for living beings
Sub-heading: Feeling connected to place
Heading: Actions, Consequences, and Reflection
Sub-heading: What I do → What happens to nature
Sub-heading: How nature affects me
Heading: Developing Stewardship
Sub-heading: Taking responsibility
Sub-heading: From "I" to "We" (community & environment)

Core Information / Tips for Teachers
Create safe spaces for student reflection: small-group circles, journals, paired sharing.
Use stories (fiction or real) about nature and people, ask emotional reflection ("How would you feel if…?").
Encourage students to link feelings to action: e.g., "Because I felt upset seeing litter by the river, I can pick it up and ask others to help."
Model vulnerability: share your own reflections about nature, show that caring matters.

Learning Materials	Story: "The River Who Cried" (teacher-created or local folktale)	
	Short video: "Kids Who Care for the Planet" (YouTube/DepEd TV)	
	Posters: "Effects of Pollution" and "Clean vs. Dirty Environment"	
	Reflection Cards: "I Feel / I Think / I Can Do" prompts	
	Activity 1: Story Circle — "Tales of the Earth"	Read the story aloud. Ask: How did the river feel? What could the people have done differently? Students act out or draw the story's message.
	Activity 2: Emotion Mapping	Draw your community and mark green (happy) and red (sad) spots based on cleanliness or greenery. Discuss what can change red spots to green.
	Activity 3: Values Reflection Journal	Prompt: "Today I felt ___ when I saw ___. I will help by ___."
Assessments	Journal Rubric:	Emotion (clarity)
		Understanding (linking cause/effect)
		Action (realistic).
	Peer Feedback:	Students share one reflection and receive supportive feedback.
	Optional Quiz:	Match cause (pollution, littering) to effect (dirty water, sick fish).
		Answer Key (Sample Quiz) Pollution → Dirty water Littering → Flooding Deforestation → Fewer animals

For Further Study
CleanChoiceEnergy.com: “Ways to Teach Kids About the Environment.”
DepEd EsP 6 Module: “Pagmamalasakit sa Kalikasan.”
Short film: “The Lorax” (for class discussion on responsibility).

References
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NEEF (2023). Environmental Learning Benefits.
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MODULE 3: Acting for the Planet (Responsibility & Citizenship)

“The self is not something ready-made, but something in continuous formation through choice of action.” — John Dewey (1922, Human Nature and Conduct)

Learning Objectives
By the end of this module, students will:
Identify local environmental issues.
Plan and carry out a small eco-action project.
Collaborate with classmates and community members.
Reflect on their learning and contribution.

Overview
This module puts learning into action. Students become environmental stewards by designing and implementing small projects that benefit their school or community — bringing Dewey’s experiential learning to life. According to the National Environmental Education Foundation (2023), project-based environmental learning empowers students to act as agents of change.

Key Concept:
Environmental Action and Stewardship

Pre-Test (Optional)
What is an environmental problem in your community?
What can students do to help the environment?
Define “responsibility.”

Introduction
Environmental citizenship means being responsible for your surroundings. Following Dewey’s view that learning happens through action, this module lets students apply what they know to solve real problems in their environment.

Lecture / Concept Definition

What is environmental action and stewardship? Environmental action refers to behaviours and initiatives that reduce negative environmental impacts and foster ecological sustainability. Stewardship means taking responsibility for caring, protecting, and restoring the environment. (EcoMENA)

Citizenship and the environment: Learners as active citizens have roles in their school, home and community to contribute to environmental well-being. Understanding civic responsibility enhances environmental literacy. (iberdrola.com)

Focus: “What can I do to help?” Encourages students to plan, act, reflect and continue responsibility for environmental care.

Key terms to define: stewardship, sustainability, civic responsibility, community action, recycling, conservation.

<table>
<tr><td colspan="4">Structured Content
Heading: Personal Action and Environmental Impact
Sub-heading: Small actions, big differences
Sub-heading: Using resources wisely
Heading: Community and School Responsibilities
Sub-heading: Waste management and recycling
Sub-heading: Tree planting, cleaning initiatives
Heading: Planning for Sustainable Futures
Sub-heading: Setting goals
Sub-heading: Reflection, monitoring, continuous improvement

Core Information / Tips for Teachers
Guide students to choose a manageable project (one that can be done in 1–2 weeks) to build sense of accomplishment.
Use project-based learning: plan → act → evaluate → reflect.
Encourage peer leadership: students lead teams and record progress.
Link project with local context (school yard, nearby park, community waste site) so efforts are tangible.
Encourage students to share results with wider community (parents, barangay, local government) to increase ownership and visibility.</td></tr>
<tr><td rowspan="4">Learning Materials</td><td colspan="3">Video: “School Clean-Up Campaigns” (DepEd TV)</td></tr>
<tr><td colspan="3">Sample Project Plans from Tomas Cabili and Sultan Mamarinta Schools</td></tr>
<tr><td colspan="3">Template: Eco-Project Logbook</td></tr>
<tr><td colspan="3">Posters: “The 5Rs – Refuse, Reduce, Reuse, Recycle, Repair”</td></tr>
<tr><td rowspan="4">Learning Activities</td><td>Activity 1: Plan It! – Action Project Workshop</td><td colspan="2">In groups, identify a problem (e.g., litter, lack of plants). Use the Eco-Project Logbook to plan: goal, materials, timeline, roles.</td></tr>
<tr><td>Activity 2: Do It! – Implementation Week</td><td colspan="2">Execute the plan. Document progress using photos and notes.</td></tr>
<tr><td>Activity 3: Show It! – Eco Fair Presentation</td><td colspan="2">Present outcomes to teachers and community (before/after photos, posters, short videos).</td></tr>
<tr><td>Activity 4: Reflect It! – My Environmental Pledge .</td><td colspan="2">Students write one commitment to continue eco-friendly habits</td></tr>
<tr><td rowspan="8">Assessments</td><td rowspan="5">Project Rubric:</td><td>Planning</td><td>(20%)</td></tr>
<tr><td>Collaboration</td><td>(20%)</td></tr>
<tr><td>Implementation</td><td>(30%)</td></tr>
<tr><td>Reflection</td><td>(30%)</td></tr>
<tr><td>Total</td><td>100%</td></tr>
<tr><td rowspan="2">Self-Assessment:</td><td colspan="2">“I helped by ___; I learned that ___.”</td></tr>
<tr><td colspan="2">Answer Key (Self-Assessment Sample)
“I helped by planting trees.”
“I learned that teamwork makes a big difference.”
“Next time, I will encourage more classmates to join.”</td></tr>
<tr><td rowspan="3">Teacher Observation Checklist</td><td colspan="2">Initiative</td></tr>
<tr><td colspan="2">Teamwork</td></tr>
<tr><td colspan="2">Consistency</td></tr>
<tr><td colspan="4">For Further Study</td></tr>
</table>

NEEF (2023): Environmental Education Activities for K–12
DepEd's Project W.A.T.C.H. environmental campaigns
LGU or NGO partnership programs (for school extension activities).

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IV. Core Information for Teachers
Instructional Strategies

- Experiential Learning: Learning by doing (eco-walks, experiments, art).
- Reflective Dialogue: Encouraging critical and emotional reflection.
- Collaborative Learning: Group work and peer feedback.
- Values Integration: Connecting moral decision-making with environmental issues.

Pedagogical Tips

- Encourage students to observe and describe before analyzing.
- Use real-life local examples (school waste, nearby river, trees).

- Link lessons to students' emotions and daily lives.
- Facilitate, don't lecture — let students build understanding through experience.

VI. Supporting Resources

Suggested Reading & Media:

- DepEd Learning Resources Portal (Environmental Education Materials)
- Video: "Basura Mo, Sagot Ko" (DepEd TV Episode)
- Poster: 5Rs of Waste Management (Refuse, Reduce, Reuse, Recycle, Repair)
- Articles: "Caring for the Earth" (DepEd EsP Lesson Series)

Teacher Tools:

- Rubric templates (for reflection, projects, and creativity)
- Story library of short moral-environmental tales
- Audio storytelling files and PowerPoint visuals

VII. Case Studies / Examples

Case 1: Tomas Cabili Village Elementary School

Teachers integrated the Eco-Walk and Storytelling modules during Science Week. Students showed improved reflection and participation, with 80% voluntarily joining a weekend clean-up drive.

Case 2: Sultan Mamarinta Panandigan Integrated School

The "Bayan Ko, Linis Ko" project led students to reuse plastic bottles as planters. Teachers noted "heightened motivation and teamwork," linking it to Dewey's idea that learning happens when thought and action meet.

VIII. Tools and Physical Supplies

Category	Items Needed	Purpose
Specific Tools/Equipment	Cameras/Tablets, Art boards, Magnifying glasses	Observation and creative documentation
Consumable Materials	Paper, coloring materials, recycled bottles, seedlings, labels	For journals, posters, and eco-projects
Technology Aids	Laptop/projector (optional), interactive whiteboard	Display resources and videos

IX. Guidance and Assessment

Facilitator's Guide

Implementation Plan (Suggested Timeline):

Week	Focus Activity	Learning Outcome
Week 1	Eco-Discovery Walk	Observation & description
Week 2	Storytelling Circle	Emotional awareness
Week 3	Mapping & Art	Creative understanding
Week 4	Eco-Action Project	Responsibility & initiative

Adaptation Tips:
Shorten or extend modules based on time.
Pair activities with MELC competencies per subject.
Combine journal writing with EsP reflections.

Assessment Tools

Method	What It Measures	Sample Tool
Observation Checklist	Engagement and participation	During eco-walks
Rubric for Reflection Journals	Depth of reflection	4-point scale
Creative Output Rubric	Clarity and originality	Mapping/posters
Project-Based Assessment	Collaboration and initiative	Action project logbook

Sample 4-Point Rubric:

Level	Description
4 – Excellent	Demonstrates critical insight, creativity, and initiative
3 – Proficient	Shows good understanding and consistent effort
2 – Developing	Basic understanding; needs guidance
1 – Beginning	Limited participation or incomplete work

Feedback Mechanisms

- Student Feedback Forms: Rate interest and difficulty (1–5 scale).
- Teacher Reflection Log: Record what worked and what needs adjustment.
- Peer Review Circles: Students discuss each other's work and learn collaboratively.

X. Design and Usability

- Logical Organization: Divided into modules that progress from awareness → reflection → action.
- High-Quality Design: Use visual aids, colorful worksheets, and story visuals.
- Accessibility: Printable in black-and-white; adaptable for limited-resource classrooms.
- Flexibility: Activities can be done indoors or outdoors, individually or in groups.

Summary of findings and Recommendations

This study aimed to explore the potential of a pedagogical intervention grounded in experiential and reflective learning in improving the environmental awareness of Urban and Rural learners. Based on the qualitative data gathered, there were observable insights into how the participants understand environmental issues. However, the degree to which this awareness was developed needs to be clarified more carefully.

In this study, a distinction was made between surface-level and deep-level environmental awareness. Surface-level awareness was reflected in the learners' ability to identify environmental issues, recall basic concepts, and express general concern. In contrast, deep-level awareness was seen in their ability to connect these issues to their lived experiences, engage in critical reflection, and suggest possible actions or solutions. The findings suggest that the participants generally demonstrated awareness at a surface level, with limited evidence of deeper engagement. This indicates that while awareness exists among urban learners, it may not yet translate into more reflective or action-oriented understanding.

Rather than implementing an intervention, this study proposes a Dewey-inspired pedagogical toolkit as a possible response to the patterns observed in the data. Grounded in experiential learning, the toolkit is envisioned to include activities such as eco-walks, participatory mapping, storytelling, and guided reflection. These are intended to help learners connect environmental concepts to their everyday realities and move beyond surface-level awareness. For instance, eco-walks may allow learners to directly engage with their environment, while participatory mapping can help them identify and analyze local environmental issues. Reflection activities are expected to support

deeper processing of these experiences. However, since this toolkit was not implemented within the study, its effectiveness remains theoretical and requires further investigation.
This study is also limited by its small sample size, which restricts the generalizability of the findings. The results should therefore be understood within the specific context of the participants involved. Despite this limitation, the study provides initial insights into the current state of environmental awareness among urban learners and highlights the need for more structured and experience-based approaches in environmental education.

Overall, the findings suggest that while urban learners demonstrate awareness of environmental issues, this awareness tends to remain at a surface level. The proposed pedagogical toolkit offers a possible direction for addressing this gap, but future studies are needed to implement and evaluate its effectiveness in fostering deeper environmental understanding.

Recommendations

Based on the findings and conclusions, the following recommendations are proposed:

School-Level Recommendations

Strengthening Teachers

Teachers trained in experiential environmental learning may be better prepared to guide children through toolkit activities, promoting awareness and action. Improving teacher training may help children engage in experiential learning activities effectively, informing the development of toolkit activities. As seen in the literatures teacher has a big role in fostering environmental awareness to learners that would lead to action, if the teacher themselves does not have the ability or is not trained to guide children this regardless how well-designed the instructional toolkit is, its intended objectives may not be fully achieved without proper teacher facilitation. Teacher will serve as the bridge between this gap (awareness and practice) and if the bridge it self also has this gap, the bridge can serve its purpose.

Develop context-specific environmental programs.

Sultan Mamarinta Panandigan Integrated School or Rural-highlands can focus on forest, land-use, and agricultural issues. Cabili Village Elementary School or Urban–coastal schools can focus on waste management, coastal hazards, and urban pollution. Context-specific environmental programs are needed as the environment can affect the acquisition and processing of information (like environmental issues). The more the learners can observe and experience environmental concepts, the deeper they feel connected to it.

Strengthen community-based environmental activities.

Schools, especially elementary schools, should have a good relationship and partnership with barangay units, NGOs, and parent groups to conduct local clean-ups, tree-planting with monitoring, recycling workshops, and children-led environmental campaigns. In this way we can be a reflection of a community that is not just environmentally knowledgeable but a community with good environmental practice. This may provide the kind of “experience” children need to help address the gap between environmental knowledge and environmental praxis. Williams (2017) foregrounds the idea that “school should be representative of a social environment” — real-life, community-based, interactive settings — because social interaction is central to learning. And according to John Dewey, its is in the environment, the place they live, who will give the students experience they need for better learning. This environment he is referring to is not just the physical and natural environment but this environment includes us. Hence, we should give the students not just a school that fosters learning but a community that gives them experience.

Integrate/ enhace eco-literacy across subjects.

Environmental learning should not remain isolated in science but can be embedded into subjects like Araling Panlipunan, where they can tackle community issues concerning environmental degradation and protection. Filipino/English where teachers shares environmental storyand narratives that is relatable to the kind of environment the School is located. Arts where teacher can conduct activities like eco-drawing and poster-making this is not just an activity where students produce an art there should be a reflection or an art processing at the end, where children needs to narrate how they interpret there art and why choose to draw this art. Although eco-literacy has already been reflected in the subjects above, enhancing teaching methods and delivery may help strengthen environmental knowledge and practice.

Recommendations for Future Research

The future researchers should conduct longitudinal studies to observe whether experiential learning sustainably improves children's ecological literacy over time, as this is what this study fails or is limited to do. They should also explore the teacher readiness and pedagogical practices in integrating environmental education for a competency-based curriculum. Teacher competencies is crucial in the learning process. Lastly, future researchers should also need to examine socio-cultural factors—family practices, community norms, and local environmental conditions—that influence children's development of environmental awareness. Although this study aims to identify the difference between how geographic location and socio-cultural implications affect the environmental awareness of the students, the researcher still finds it supplementary.

The findings of this study reveal that while children exhibit strong environmental concern and recognition of issues, their ecological literacy remains limited by insufficient vocabulary, analytical reasoning, and actionable understanding. The proposed Deweyan-inspired instructional toolkit serves as a pedagogical framework that may support environmental education and sustainability-oriented learning. Through experiential, guided reflective, and inquiry-based activities, schools may help cultivate environmentally-aware citizens capable of critical thought and meaningful action, which may contribute to a sustainable future.

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